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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: RUIZ ORERA, JORGE
Referencia: RYC2025-056165-I
Correo Electrónico: jorge_ruiz_orera@hotmail.com
Título: Evolution, characterization and therapeutic potential of small open reading frames
Resumen de la Memoria:

While conserved protein-coding genes only comprise 1-2% of the human genome, one of the keys to human complexity lies in the overlooked molecular roles of the remaining 99% of our DNA. My research has been centered on understanding the evolutionary and functional significance of these non-coding regions of the human genome:

Research Line 1: The Role of Long Non-Coding RNAs in De Novo Gene Evolution

The behavior and physiology differences among closely related species are intricately linked to variations in their gene content. While gene duplication and subsequent sequence divergence have been the recognized mechanisms for gene birth, the emergence of genetic novelty through de novo gene evolution has been a longstanding mystery in evolutionary biology. I have pioneered computational approaches to investigate this mode of gene evolution. Utilizing large-scale transcriptomics and translomics data, I identified hundreds of new human- and primate-specific long non-coding RNA (lncRNA) genes, challenging the belief that human de novo evolved genes are rare. This work highlighted the significant role of de novo gene evolution in shaping functional innovations in mammals, with recent evidence confirming its widespread occurrence in evolution.

Research Line 2: Evolution, Annotation, and Characterization of Non-Canonical Open Reading Frames

Building on the understanding that many lncRNAs are recent in evolution and associated with ribosomes, I explored the role of non-canonical open reading frames (ORFs). Analyzing public ribosome profiling datasets across diverse rodent tissues, I established computational methods to assess the conservation and coding potential of translated ORFs. I identified hundreds of "non-canonical" translations in rodents, lacking evolutionary conservation or selective constraints. Some recently evolved ORFs were under selection, indicating recent functional acquisition. During the last years, I led projects developing computational approaches for developing and analyzing ribosome profiling datasets in various human settings, including datasets with clinical relevance for cancer. I currently co-lead an international consortium effort to create a consolidated annotation catalog of human ORFs. I mainly contributed an open-source computational method for their first genome-wide identification in a pilot project.

Research Line 3: The Translational and Single-Nucleus Transcriptomic Landscape of Cardiac Disease

During my career, I developed computational approaches in extensive collections of sequenced mammalian cardiac translomes. In the first collection involving a well-characterized rat model system, I found a genetic translation machinery defect that led to a heart-specific reduction in overall protein synthesis, particularly in microproteins. In the second collection of 80 human left ventricle transcriptomes, I assisted a PhD student in identifying 27 RNA-binding proteins associated with cardiac translational regulation in vivo. More recently, I collaborated in generating and analyzing the largest cell atlas of cardiac disease, utilizing single-nucleus RNA sequencing to characterize the transcriptome of non-ischemic adult human hearts across Dilated Cardiomyopathy (DCM), Hypertrophic Cardiomyopathy (HCM), and Heart Failure with preserved Ejection Fraction (HFpEF).

Resumen del Currículum Vitae:

I am a Computational biologist with an academic background in Biotechnology and Bioinformatics. I completed my Ph.D. dissertation in Biomedicine with Prof. Dr. Mar Albà (GRIB, Barcelona) in 2017. As a predoctoral trainee, I pioneered the study of de novo genes and translated long non-coding RNAs, and my work resulted in the publication of three first-author, high-impact articles. My Ph.D. was funded by the Science Ministry and was awarded the Doctoral School Special Prize of the Ph.D. Programme in Biomedicine and the International Mention for a short-term research stay hosted by Prof. Dr. Diethard Tautz at the MPI for Evolutionary Biology (Plön, Germany) in 2015.

I am currently a Postdoctoral Researcher at the Max Delbrück Center in Berlin (Germany), supervised by Prof. Dr. Norbert Hübner, a referent researcher in the field of Cardiovascular Disease. My research track has provided me with an excellent background in multiple unique state-of-the-art computational disciplines. For example, I have developed computational methods for the analysis of large-scale multi-omics data. I have also established a method for the genome-wide identification of novel non-canonical human translations and microproteins, generating the first set of non-canonical translated sequences supported by GENCODE. My track record consists of 31 scientific articles. My independent and committed involvement in these projects is emphasized by twelve first author (six unique and six shared), five second author, and three co-correspondence author contributions.

As a proponent of open science, I have actively promoted public open access and ensured research reproducibility by making all computational tools available in open repositories. Through participation in a one-year career development program at my current institute (ASPIRE), I have enhanced my academic leadership skills and gained additional qualifications. I have mentored four Ph.D. candidates and formally supervised the work of two master students.

I regularly build upon my scientific knowledge through workshops and conferences. I am currently a member of The Society for Molecular Biology and Evolution and the Spanish Society of Bioinformatics and Computational Biology. I support community building, and I have developed my own



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

independent networks in evolutionary biology, bioinformatics, and reference annotation communities. I am currently involved in joint projects with several national and international researchers. I have independently initiated and co-founded an international consortium to create a unified catalog of microproteins and non-canonical translations (Mudge et al. 2022, I am co-first and co-corresponding author). This consortium is currently supported by the main reference annotation databases and includes several world-recognized researchers in the fields of genomics, proteomics, and database annotation. This ambitious consortium pursues the long-term objective of characterizing the hidden proteome, a task that will require strong multidisciplinary skills, which I have collected during my academic track.

I have always been very motivated to pursue an independent research career in higher education or other Spanish scientific institutions. I am confident the RyC Track will be a key milestone to achieve this goal.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: MARTINEZ CALVO, ALEJANDRO
Referencia: RYC2025-055922-I
Correo Electrónico: am72@princeton.edu
Título: Microbial communities in complex environments: stressors, trophic interactions, and collective behaviors
Resumen de la Memoria:

I am an Associate Research Scholar and HFSP/PCTS fellow at Princeton University, working on biophysics and quantitative biology across the Departments of Physics, Chemical & Biological Engineering, Molecular Biology, and the Lewis-Sigler Institute. Previously, during my PhD at UC3M, Spain, I made fundamental contributions to fluid mechanics and soft matter, focusing on fluid-fluid interfaces with complex chemo-mechanical properties arising from adsorbed molecules. My research integrates experiments, theory, and computation, to uncover how microbial communities and other active biological systems self-organize and function in realistic 3D environments. I have built a multidisciplinary research portfolio spanning biophysics, nonequilibrium phenomena, active matter, soft-matter physics, and microbial ecology, and I am now establishing an independent scientific profile through a growing network of international collaborations, mentees, and high-impact publications.

My research has opened new avenues for understanding how microbial communities function and organize in realistic 3D environments. In my independent group, I will integrate experiments, theory, and computation to discover new biophysical principles governing microbial communities across scales. Specifically, I will focus on how phages, antibiotics, and other stressors shape bacterial organization, cooperation, and survival. My lab will develop a unified framework linking molecular defense mechanisms, community-level strategies, and ecosystem dynamics. This multidisciplinary approach will advance knowledge in microbiology, physics, and ecology, and inform efforts to control microbial populations in health and environmental management. Success in these directions will deepen our understanding of microbes in complex environments and offer strategies to combat antimicrobial resistance, promote sustainable food production, and restore ecological balance.

I have published 30 peer-reviewed papers, including work in PNAS, PRX, Nat. Commun., Curr. Biol., Soft Matter, Phys. Rev. Lett., and J. Fluid Mech., with 18 first/co-first-author publications. My h-index is 12, with 470 citations. My work has provided new insights into the morphodynamics of microbial communities, bacterial chemotaxis and pattern formation, bacteria-phage interactions, enzyme self-organization, membrane fission, and the physics of complex interfaces. I have led the theoretical components of multiple collaborative projects and established a visible international profile through invited talks at institutions including EPFL, UPenn, Johns Hopkins, and Princeton.

I have secured highly competitive funding throughout my career, including Spain's FPU fellowship and mobility grants, the Princeton Center for Theoretical Science Postdoctoral Fellowship (\$276k), the Human Frontier Science Program Fellowship (\$216k), and the PCTS John Archibald Wheeler Fellowship. I have twice been selected as Princeton's nominee for the US Regional Blavatnik Awards and received the Extraordinary PhD Thesis Award from UC3M. These distinctions reflect both the scientific impact and the independence of my research program.

Resumen del Currículum Vitae:

For my PhD at UC3M, I made fundamental discoveries in fluid mechanics and soft matter, focusing on fluid-fluid interfaces with complex chemo-mechanical properties caused by adsorbed molecules. This work led to 11 publications in Phys. Rev. Lett., Nat. Commun., J. Fluid Mech., Phys. Fluids, and Soft Matter, all as first or co-first author. In my postdoc at Princeton University, I transitioned into biophysics and quantitative biology. As an independent HFSP & PCTS fellow, working with Profs. Sujit Datta, Ned Wingreen, and Zemer Gitai, I have leveraged my PhD expertise while developing new experimental, theoretical, and computational skills to elucidate how living systems self-organize and function in 3D complex settings that mimic real-life environments. My multidisciplinary training enables me to address outstanding questions about collective behavior in living systems. One of my primary achievements as a postdoc has been to unravel the factors that determine the shape of single and multi-species growing microbial colonies as shape is known to influence their collective function. I have led the experimental and theoretical efforts of various postdoctoral projects across a wide range of topics, advancing our understanding of bacterial chemotaxis, bacteria-phage interactions, bacterial membrane fission, organoid morphodynamics, and enzyme self-organization in metabolic pathways. To date, I have 24 publications (18 as first/co-first author), 2 under review, and 4 in preparation, and an h-index of 12 with 470 citations.

I have secured several competitive fellowships and grants, including Spain's FPU doctoral fellowship, two FPU mobility fellowships, a Princeton Center for Theoretical Science Postdoctoral Fellowship (\$276,000), a Cross-disciplinary Human Frontier Science Program Fellowship (LT000035/2021-C; \$216,000), and a PCTS John Archibald Wheeler Fellowship. I was also selected as one of Princeton University's nominees for the prestigious US Regional Blavatnik Awards and received the Second Prize in the XV Certamen Arquímedes (2016). These distinctions highlight the impact and independence of my research. Through these projects, I have developed advanced experimental, computational, and theoretical capabilities while leading collaborative efforts with experimentalists and theorists across Europe and the United States.

In my career, I have given 40 contributed talks at international conferences, workshops, seminars, and symposiums, as well as 7 invited talks at leading institutions (EPFL, ULB, Johns Hopkins University, Princeton University, UPenn, and HFSP). In addition, I have co-organized multiple workshops, including "Microbial Collectives in Action" at the CUNY Graduate Center (co-organized by the Initiative for the Theoretical Sciences and the Princeton Center for the Physics of Biological Function) and "Space: The Final Frontier of Microbial Communities" at the Princeton Center for Theoretical Science. I also organized the weekly seminar series "The Soft Materials Coffee Hour" at Princeton University. I have served as a discussion leader at the Gordon Research Seminar "Complex Active and Adaptive Material Systems", and as an external reviewer for numerous international journals (Science, Nat. Commun., Phys. Rev. Lett., J. Fluid Mech., Phys. Fluids, Phys. Rev. Fluids, eLife, PLOS Comput. Biol., and J. Chem. Phys.).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: JOYCE, WILLIAM
Referencia: RYC2025-056163-I
Correo Electrónico: wimjoyce92@gmail.com
Título: Functional Genetics of Cardiac Proteins

Resumen de la Memoria:

My research investigates how vertebrate hearts maintain diastolic function under extreme physiological demands, with the ultimate goal of translating these insights into novel therapeutic strategies for cardiac disease. This involves combining comparative genomics, functional genetics (including gene editing), and integrative physiology.

During my PhD at Aarhus University (Denmark), I performed in vivo functional studies across multiple species, establishing a mechanistic understanding of the determinants of cardiac filling. Extended research stays at Amsterdam UMC (the Netherlands) and the University of North Texas (USA) broadened my expertise to include immunohistochemistry, optical mapping, and advanced surgical techniques. A formative experience was a field season in Antarctica, where I studied cardiovascular performance in haemoglobinless icefish. These “natural knockouts” revealed how lineage-specific genomic alterations shape cardiac physiology.

In my postdoctoral career I have held two highly competitive and prestigious individual fellowships, first from the Novo Nordisk Foundation (Postdoc Fellowship for Research Abroad, DKK 3,924,561= approx. \$527,000, 2020-2023, conducted in Canada, UK and Denmark) and currently La Caixa Foundation Junior Leader (\$301,500.00, 2024-2027, at Centro Nacional de Investigaciones Cardiovasculares, Spain). Both these fellowships have allowed me to design and implement my own research lines.

As part of the first fellowship, I learnt gene-editing (CRISPR-Cas9) techniques in order to generate a beta1-adrenergic receptor knockout zebrafish line, advancing understanding of adrenergic control of cardiac performance, with first-author work published in *Acta Physiologica*. I then explored sarcomeric evolution through comparative genomics and transcriptomics, culminating in a first-author *Science* paper demonstrating that mammals with exceptionally high heart rates such as shrews and bats have lost a cardiac troponin I exon—an adaptation that mimics adrenergic stimulation to protect diastolic function. Currently, as a La Caixa Junior Leader Fellow, I lead a program on lactate metabolism and transport in the heart and other tissues. By studying diving mammals, which endure high lactate loads while maintaining cardiac performance, I am uncovering novel innovations in lactate transporter expression and function.

Looking ahead, my goal is to translate evolutionary insights into therapeutic innovation for heart failure. Building on my discovery of adaptive troponin I exon skipping, I will develop RNA-based interventions to induce similar splicing in human cardiomyocytes. Using hiPSC-cardiomyocyte models, I have led the collection of preliminary data showing cardiac troponin I exon 3 skipping can be effectively induced with antisense oligonucleotides. Future work within the next 5 years will investigate if this can restore contractile function in cardiomyocytes harbouring pathogenic genetic variants (e.g. hypertrophic cardiomyopathy, HCM). I have also begun generating new transgenic mouse lines, including Tnni3 exon-3 deleted and humanized models, for in vivo studies with RNA-based interventions. Further work will use these mouse models to investigate troponin I modulating therapies in the context of heart failure with preserved ejection fraction (HFpEF) and HCM.

Resumen del Currículum Vitae:

I integrate evolutionary genomics and comparative physiology to reveal how cardiac function diversifies across vertebrates and how these insights can guide new cardiac therapeutics.

Professional positions:

- La Caixa Junior Leader Postdoctoral Fellow, Centro Nacional de Investigaciones Cardiovasculares (CNIC), Spain June 2024–present
- Postdoc, Centro de Investigación Biomédica en Red (CIBER), Spain Sept 2023–May 2024
- Postdoc, Aarhus University (Denmark) May 2020–Aug 2023
- Visiting Academic, University of Manchester (UK) Apr 2021–Apr 2023
- Affiliated Postdoctoral Fellow, University of Ottawa (Canada) May 2020–Mar 2021
- Postdoctoral Fellow, University of Ottawa (Canada) Aug 2019–Apr 2020

Education:

- PhD in Bioscience, Aarhus University (Denmark), 2014–2019 (awarded 3rd May 2019). Science and Technology "Talent Award" in 2017.
- BSc (Hons) Zoology with Industrial Experience, University of Manchester (UK), 2010–2014. Faculty of Life Sciences Top Student Prize (2014).

Research outputs:

- 46 peer-reviewed articles (33 first author, 2 last author, including 31 as corresponding author) in journals including Science, Acta Physiologica and Physiology.
- 4 book chapters
- 20+ invited talks and conference presentations

International research experience:



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

- Universidade Federal de São Carlos (Brazil), Mar 2019 – research trip
- Amsterdam Medical Centre (Netherlands), Feb–Jun 2018 – research trip
- University of North Texas (USA), Sept–Nov 2017 – research trip
- Palmer Station (Antarctica), Apr–Jul 2017 – research expedition
- White Sea Biological Station (Russia), Sept 2015 – PhD course
- Can Tho University (Vietnam), Dec 2014 – PhD course

Research grants as PI:

- La Caixa Foundation, Junior Leader Fellowship – 301,500 (2024–2027)
- Novo Nordisk Foundation, Postdoc Fellowship – DKK 3,924,561 (approx 527,000) (2020–2023)

Academic service:

- Guest Editor for Special Issues in Journal of Experimental Biology (2024) and Comparative Biochemistry & Physiology (2024)
- Peer-reviewed >75 manuscripts for journals including Science Translational Medicine, Acta Physiologica, Genome Biology and Evolution
- Editorial Board Member: Journal of Thermal Biology
- Co-organizer of 100 Years of SEB session at SEB Centenary Conference (Edinburgh, 2023)
- Committee member for Danish Cardiovascular Academy Winter Meeting (Malaga, 2022)

Science communication:

- 16 Outside JEB articles for Journal of Experimental Biology
- Ongoing blog posts on personal website: <https://sites.google.com/view/joyce-cardiac-proteins>

Supervision:

- Current co-director of 1 PhD thesis (UAM–CNIC)
- Completed co-director of 1 MSc thesis (UAM–CNIC)
- Co-supervised 3 BSc projects (Aarhus University ×2; University of Ottawa ×1)



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología

Nombre: PAVLIUKOV, MARAT

Referencia: RYC2025-055498-I

Correo Electrónico: maratpav@g.ucla.edu

Título: The role of extrachromosomal DNA in intercellular communication and tumor progression in glioblastoma

Resumen de la Memoria:

Glioblastoma (GBM) represent a complex ecosystem of intertwined interconnections between various cell types. Through diverse mechanisms of intercellular communication, GBM cells modulate the behavior of both malignant and non-tumor cells, promoting cancer progression. One of the key drivers of GBM plasticity and adaptability is extrachromosomal DNA (ecDNA). ecDNA allows GBM cells to rapidly and reversibly modify their genome and by thousands of folds increase the expression of critical oncogenes. However, virtually nothing is known about the role of ecDNA in intercellular communication. Our preliminary results unexpectedly revealed that various ecDNAs can be transferred both between GBM cells and from GBM to non-tumor cells. Building on these findings, in this project we aim to investigate ecDNA intercellular transfer² its mechanism, impact on tumor progression and recurrence, as well as its potential therapeutic implications. In the first aim we will use in vitro gliomasphere models to examine the intercellular transfer of the five most prevalent ecDNAs in GBM (ecEGFR, ecCDK4, ecMDM2, ecPDGFRA and ecMYCN). The results of these studies will allow us to identify pathways of ecDNA export and to compare transfer of efficiency of different ecDNAs. In the second aim we will investigate the effect of exogenous ecDNA on recipient GBM cells and will study how these molecules contribute to cellular adaptation across diverse tumor microenvironment niches. In the third aim we will use hESC-derived cerebral organoids, patient-derived endothelial cells, hESC-derived microglia, neurons and astrocytes, complemented by data analyses from patient tumor samples, to comprehensively study ecDNA transfer to non-tumor cells. With the help of single cell RNAseq and LC-MS/MS profiling of cell secretomes, we will investigate effects of transferred ecDNAs on non-tumor cells and will test the hypothesis that extracellular ecDNA can reprogram these cells to adopt tumor-supportive phenotypes. Finally, in the last aim we will identify molecules that inhibit ecDNA transfer or impair ecDNA maintenance in recipient cells in vitro, and will test effects of these compounds on GBM progression in both immunocompromised and immunocompetent mouse GBM models in vivo. The results of these studies will not only demonstrate a novel mechanism of intercellular communication but may also change our understanding of tumor microevolution. Due to the high copy number and elevated susceptibility to mutations and rearrangements, ecDNA accelerates cancer evolution. However, tumors still have to pass through a bottleneck of clonal competition. If ecDNA can be horizontally transferred, it would dramatically increase the adaptation capacity of the malignancy. In addition, if transferred to normal cells, ecDNA could alter their behavior to facilitate further tumor progression, or even turning recipient cells into new seeds for tumor recurrence. Understanding these mechanisms could pave the way for developing novel therapeutic strategies that inhibit ecDNA-mediated communication and facilitate standard GBM treatment modalities.

Resumen del Currículum Vitae:

I am a molecular biologist with a deep interest in basic and translational research in brain cancer. My work is driven by two equally important goals: to uncover the fundamental molecular mechanisms that govern malignant cell behavior, and to leverage this knowledge to develop strategies that will improve patient outcomes.

From a basic science perspective, I have a long-standing interest in intercellular communications. Throughout my research, I have uncovered multiple mechanisms underlying crosstalk between different cellular populations within the tumor. From a translational standpoint, my major goal is to identify novel therapeutic strategies for glioblastoma (GBM) patients. GBM is one of the most aggressive human cancers, marked by short survival and nearly universal mortality. Therefore, developing more efficacious treatments of GBM is an area of urgent need. I was able to create three novel small-molecule inhibitors targeting distinct GBM cell populations that demonstrated strong antitumor activity both in vitro and in vivo. In parallel, I established a TOF-SIMS²-based approach for simultaneous detection of protein and metabolite distributions in GBM tissue sections at 800 nm spatial resolution. This technique can visualize tumor²normal tissue boundaries and, with further optimization, may have important clinical applications.

After earning doctoral degree in 2019, I received several national awards for outstanding young scientists in Russia, along with more than \$600,000 in competitive research funding. I initiated collaboration with scientists from the USA, China, Japan, India and France, to uncover molecular mechanisms driving emergence of GBM intratumoral heterogeneity. Our results revealed a novel mechanism of tumor microenvironment-regulated ribosomal specialization and demonstrated how minor alterations in RNA splicing can have global impact on the proteome of cancer cells. Building on these findings, we identified a compound that impairs tumor microenvironment-induced splicing changes, decreases GBM stemness and inhibits tumor growth in vitro and in vivo.

In 2022, I joined the laboratory of Dr. Juan Valcárcel, a world leader in the field of alternative splicing, at the Centre for Genomic Regulation (CRG). I was working there on two projects: elucidating the role of microexons in GBM intratumoral heterogeneity, and identifying neoantigens generated through aberrant RNA splicing to subsequently use them as targets for immunotherapy. Finally, in 2024, I accepted a Project Scientist position in the laboratory of Dr. Harley Kornblum at the University of California Los Angeles, where I launched my own projects aimed to study the roles of RNA splicing and extrachromosomal DNA in GBM progression and intercellular communications. In August 2025, I received a seed grant from the UCLA Cancer Center to advance this research.

In summary, I have a track record of solid scientific production throughout my career and demonstrated the ability to secure competitive funding. The research lines I want to investigate in the near future, focused on the role of extrachromosomal DNA in glioblastoma progression and intercellular communication, and its potential therapeutic applications, is strongly sustained by both my theoretical and technical multidisciplinary background that I have gained during my scientific career.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: RODRIGUEZ VARELA, RICARDO
Referencia: RYC2025-055168-I
Correo Electrónico: ricardo_eyre@yahoo.es
Título: The genetic Legacy of Medieval Islamic Iberia

Resumen de la Memoria:

During the medieval period, the Iberian Peninsula served as a crossroads of cultures, religions, and ethnic groups, creating a complex historical and demographic landscape. The Islamic conquest in the early eighth century established Al-Andalus, where incoming groups from North Africa and the Middle East interacted with local Hispano-Roman, Visigothic, and Jewish communities, producing distinctive cultural and genetic patterns. The later fragmentation into Taifas and the gradual southward expansion of the Christian kingdoms further shaped regional population structure, leaving signatures detectable in present-day Iberian genomes.

My current research integrates molecular genomics, metagenomics, archaeology, and historical evidence to reconstruct the genetic and health landscapes of medieval Iberian populations. I combine ancient genome-wide data with dense modern reference panels, including African, North African, and European populations, to reconstruct ancestry, admixture, and demographic processes at high resolution. Imputation and haplotype-based analyses infer ancestry tracts, admixture timing, sex-biased gene flow, endogamy, and consanguinity. Kinship analyses within necropolises will elucidate social structures, mobility patterns, and practices such as uncle-niece marriages in Berber groups, with admixture dating calibrated using archaeological and historical records.

Ancient metagenomics provides a complementary perspective by reconstructing pathogen exposure, microbiome composition, and disease dynamics. Preliminary results from a medieval Islamic cemetery in Ibiza (Rodríguez-Varela et al., 2025, Nat. Commun., in revision) show fine-scale ancestry variation, including North African and sub-Saharan lineages, with admixture estimated to have occurred 2 to 7 generations before the individuals lived. Pathogens including *Mycobacterium leprae*, parvovirus B19, and hepatitis B virus were detected, linking microbiome patterns with health, lifestyle, and social practices, as shown in Rodríguez-Varela et al. (2024). Together, these findings highlight the value of integrating high-resolution genomic and metagenomic analyses with archaeological and historical context.

The methodologies will be applied across Iberia, encompassing Christian and Muslim necropolises throughout Spain and Portugal. Combined with dense modern reference panels, these analyses will achieve unprecedented resolution in ancestry inference, admixture timing, population structure, and disease dynamics. Integration with skeletal analyses, isotope studies, and historical documentation will link biological patterns with cultural, dietary, and social practices, enabling mechanistic models of population processes and mobility.

The establishment of a dedicated ancient DNA laboratory in Spain will support high-throughput genomic and metagenomic analyses, methodological development, and training, serving as a platform for interdisciplinary research bridging molecular biology, archaeology, and history. By producing multi-layered datasets on ancestry, admixture, and disease, this project will set new standards for integrating genomics and metagenomics into historical and archaeological research, advancing understanding of Iberian population structure, medieval Iberian history and strengthening Spain's position in international ancient DNA research.

Resumen del Currículum Vitae:

Throughout my scientific career, I have developed a strongly interdisciplinary profile that integrates molecular biology, ancient DNA, population genomics, and bioinformatics. I have broad expertise in both laboratory and computational approaches, enabling me to design, execute, and interpret research projects from sample collection to publication. I have established robust international collaborations and contributed to research addressing evolutionary, population-genetic, and archaeogenetic questions in both human and non-human organisms.

During my Master's, I investigated Pleistocene mammal diets using stable isotope analyses. My PhD at the Centro Mixto UCM-ISCIII de Evolución y Comportamiento Humanos integrated genetics, paleontology, and extensive fieldwork at Atapuerca and Pinilla del Valle. My doctoral research on Palearctic lynx species (*Lynx lynx* and *L. pardinus*) examined phylogeography and past genetic diversity, resulting in three first-author publications that clarified historical distribution, long-term low mitochondrial diversity, and demographic trajectories, demonstrating independent project design and execution.

I consolidated my expertise in human genomics through research placements at the Centre for GeoGenetics (University of Copenhagen) and Uppsala University. During this period, I gained hands-on experience with NGS authentication, contamination control, and the development of bioinformatic pipelines for degraded DNA. These projects contributed to collaborative publications, including Raghavan et al., 2015 (Science), Günther et al., 2015 (PNAS), and Simões et al., 2023 (Nature), which reflect my early work on human population structure, admixture, and gene flow.

Since 2017, as a researcher at Stockholm University, I have published 26 peer-reviewed articles, three as first author, resulting from multiyear projects in which I was responsible for all aspects, including sample acquisition, experimental work, and computational analyses. My contributions include reconstructing the ancestry of the pre-European Canary Islanders (Rodríguez-Varela et al., 2017); resolving fine-scale population structure and Viking Age mobility in Scandinavia through the integration of thousands of genomes (Rodríguez-Varela et al., 2023); and leading an interdisciplinary project combining genomics, metagenomics, and isotopes to infer ancestry, consanguinity, and pathogen presence in medieval communities (Rodríguez-Varela et al., 2024).



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My research investigates long-term population dynamics across diverse regions and periods, including Scandinavia, the Iberian Peninsula, the Canary Islands, and North Africa. I examine the demographic impact of human historical migrations and the evolutionary processes shaping genetic diversity and population structure. By integrating genome-wide data, metagenomics, and archaeological context, I study ancestry, admixture timing, social practices, and pathogen prevalence.

As a mentor, I have supervised five students (three Master's theses, two bachelor's projects) and taught over 106 hours, including a Master's course on ancient DNA. My career demonstrates scientific independence, methodological innovation, and the capacity to integrate genetics, archaeology, and history to illuminate human pasts.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: MARTÍNEZ ALVAREZ, LAURA
Referencia: RYC2025-055186-I
Correo Electrónico: laura.martinez@bio.ku.dk
Título: Inmunidad microbiana en arqueas y patógenos: mecanismos y aplicaciones
Resumen de la Memoria:

La trayectoria de la Dra. Laura Martínez-Álvarez se caracteriza por una consolidación progresiva hacia la independencia científica en el campo de la biología molecular de arqueas, con especial enfoque en virus-arquea, inmunidad antiviral y regulación del ciclo celular. Su investigación aborda una de las áreas más emergentes y menos exploradas de la microbiología, con implicaciones para la evolución de los sistemas inmunitarios, la evolución de los eucariontes y la aplicación biotecnológica de estos organismos.

Tras completar estudios de licenciatura y maestría en México con menciones honoríficas, se trasladó a Dinamarca para realizar su doctorado, donde estudió el mecanismo de replicación genómica del virus hipertermófilo SIRV2 y describió por primera vez fábricas virales en arqueas (Nucleic Acids Res IF-2016 10.16, J Virology IF-2017 4.37). Estos resultados redefinieron modelos previos sobre la biología de virus de arqueas e identificaron paralelismos inesperados con virus eucariotas.

Posteriormente, durante su etapa postdoctoral en Sudáfrica, amplió su perfil hacia la ecología microbiana y la metagenómica, liderando su primera publicación como autora de correspondencia (Appl Env Microbiol IF-2023 4.4) y estableciendo colaboraciones internacionales estables. Este periodo supuso el inicio de su línea independiente de investigación.

En su retorno a Copenhague, donde actualmente es Profesora Asistente, ha desarrollado dos líneas propias: i) inmunidad antiviral y sistemas CRISPR-Cas en arqueas y ii) regulación del ciclo celular. Entre sus avances destacan la identificación del primer regulador global del ciclo celular en arqueas hipertermófilas (Nucleic Acids Res IF-2023 16.6), el descubrimiento de más de 300 genes virales anti-defensa previamente desconocidos (Nature Communications IF-2023 14.7) y la reevaluación crítica de modelos de validación funcional de anti-CRISPR, demostrando que un inhibidor ampliamente aceptado no funciona en el sistema nativo (Nature 2025 IF-2025 50.5). Además, ha desarrollado nuevas herramientas genéticas, incluyendo estrategias de silenciamiento transcripcional basadas en CRISPR endógeno.

Cuenta con 17 publicaciones (7 como primera autora y 4 como autora de correspondencia), tres capítulos de libro y experiencia en liderazgo científico: captación de financiación competitiva internacional y nacional como IP o co-IP, supervisión de 24 estudiantes (incluyendo 2 doctorados ya defendidos y 2 en curso), impartición docente y evaluación por pares en diez revistas internacionales. Su actividad investigadora está sostenida por una red colaborativa activa en Austria, Italia, Chile, Alemania y Dinamarca.

La Dra. Martínez-Álvarez se encuentra en una fase de consolidación con un programa científico sólido, diferenciador y alineado con prioridades estratégicas europeas en biotecnología, sistemas inmunitarios alternativos y resistencia antimicrobiana. Su trabajo sitúa a las arqueas como un nuevo modelo para estudiar defensa antiviral y regulación celular, con potencial para aplicaciones en edición genética, terapias basadas en fagos y biología sintética.

Resumen del Currículum Vitae:

La Dra. Laura Martínez Álvarez es microbióloga molecular especializada en interacciones virus-hospedador, mecanismos de inmunidad antiviral (incluidos los sistemas CRISPR-Cas) y regulación del ciclo celular. Su investigación se centra en las arqueas, el tercer dominio de la vida y el menos explorado a nivel molecular, pese a su relevancia evolutiva y su notable potencial biotecnológico.

Obtuvo el doctorado en Biología por la Universidad de Copenhague (UCPH, Dinamarca, 2016) y posteriormente realizó estancias postdoctorales en Sudáfrica (University of Pretoria) y Dinamarca. Desde 2022 es Profesora Asistente en la Universidad de Copenhague. Su investigación integra microbiología molecular, genética de arqueas, genómica comparativa, virología y bioinformática.

Su producción científica incluye siete artículos como primera autora y cuatro como autora de correspondencia, publicados en revistas como Nature, Nature Communications, Nucleic Acids Research, Trends of Microbiology, Applied and Environmental Microbiology y Journal of Virology, además de capítulos de libro y conferencias invitadas. Su trabajo han dado lugar a avances conceptuales relevantes, entre ellos la primera descripción de un regulador global del ciclo celular en arqueas hipertermófilas, la caracterización de sistemas de inmunidad innata y adaptativa (CRISPR-Cas) en arqueas, así como las estrategias virales para evadir dichas defensas. En su investigación, mantiene un firme compromiso con la Ciencia Abierta y los principios FAIR mediante el depósito sistemático de datos en repositorios públicos, uso de preprints y disponibilidad de código analítico y de los recursos biológicos generados.

Ha obtenido financiación competitiva e infraestructura técnica, incluyendo recursos computacionales (DeiC), fondos para infraestructura bioinformática (EcoCluster, UCPH) y la co-dirección de un proyecto nacional sobre edición genética con sistemas CRISPR de arqueas (6,19 M DKK). En 2025 obtuvo una estancia de Cátedra Visitante en la Universidad de Nápoles Federico II para fortalecer líneas colaborativas para la revalorización de desechos agro-industriales aplicados a la producción de celulosa microbiana.

Su trayectoria refleja una creciente independencia científica mediante el desarrollo de dos líneas propias de investigación: (i) evolución de sistemas de defensa antiviral en Archaea, y (ii) regulación del ciclo celular en arqueas y su relación evolutiva con la evolución del control del ciclo celular en eucariontes. Ha supervisado la formación de 24 estudiantes, incluyendo dos tesis doctorales defendidas y actualmente codirige dos doctorandos. Además, ha contribuido a la comunidad científica como revisora de revistas de alto impacto (Nature Communications, Cell Reports Methods, mSystems, Astrobiology, entre otras) y participando activamente en redes científicas como Archaea Power Hour y el Ecology Cluster Steering Committee de UCPH.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: DE PUIG GUIXE, HELENA
Referencia: RYC2025-056081-I
Correo Electrónico: helenapuigg@gmail.com
Título: Molecular Engineering for High-Precision Diagnostics and Therapeutics

Resumen de la Memoria:

My research career combines synthetic biology, chemical biology, and diagnostics to create technologies with direct translational impact. I began by engineering gold nanoparticles for controlled release during my M.S., and then developed rapid antigen tests for Dengue, Zika, Chikungunya and other tropical viruses during my Ph.D., leading to multicountry clinical validation, four patents, and the formation of two diagnostic startups (IDX20, E25Bio). As a postdoctoral researcher at Harvard's Wyss Institute, I expanded into synthetic biology, leading the development of CRISPR-based diagnostics such as miSHERLOCK, the first portable CRISPR device integrating sample prep, amplification, and variant detection into a single unit. In parallel, I contributed pioneering work in CRISPR-responsive smart materials (Science 2019) and RNA-responsive translational control modules for eukaryotic systems (Nature Biotechnology 2022).

A major focus of my recent research is genetic code expansion (GCE). In the Wyss Institute's AminoX program, I helped develop platforms that incorporate covalent nonstandard amino acids into proteins to generate proximity-enabled covalent therapeutics and mutation-sensitive biosensors. Complementary to this, I contributed to Project Sparkle, a high-throughput system to evolve fluorogenic amino acid sensors (Nature Communications 2024). Together, these efforts expand the chemical capabilities of proteins for sensing, imaging, and therapeutic applications.

Since 2023, I have also led ExtRNA Biosciences as CEO and co-founder, applying GCE technologies to real-world problems. Under my scientific direction, the company secured over \$3.6M in contracts to engineer proteins with enhanced stability and function for cosmetics and biotechnology. This role has strengthened my independence, leadership, and ability to translate chemical biology tools into commercial pipelines.

Future Research Line: Building on my expertise in diagnostics, protein engineering, and covalent chemistries, my research will establish X-Link, a platform to generate monoclonal antibodies targeting native protein-protein interactions (PPIs). Many clinically important PPIs—such as IL-10/IL-10R, PD-1/PD-L1, OX40/OX40L, and peptide-MHC complexes—are weak, transient, and difficult to target using standard antibody discovery methods. X-Link will address this gap by using genetically encoded nonstandard amino acids (e.g., fluorosulfate-L-tyrosine) to covalently stabilize ligand-receptor complexes in their native conformations. These stabilized complexes will serve as precise antigens for antibody discovery via yeast display or immunization, allowing the selection of interface-specific antibodies with therapeutic potential.

This research will establish a new modality of “molecular glue” antibodies that stabilize signaling complexes, offering safer and more tunable alternatives to systemic cytokine dosing. The platform is generalizable, mechanistically grounded, and positioned to produce high-value IP, publications, and industry partnerships—laying the foundation for a competitive and sustainable independent research program in Spain.

Resumen del Currículum Vitae:

Dr. Helena de Puig is a scientist and entrepreneur working at the interface of synthetic biology, genetic code expansion, nanotechnology and diagnostics. She obtained an Industrial Engineering degree from Institut Químic de Sarrià (Universitat Ramon Llull, Spain, 2011) and then moved to MIT (USA) with a La Caixa fellowship, completing an M.S. (2013) and Ph.D. (2017) in Mechanical Engineering. Her M.S. work in Prof. Hamad-Schifferli's lab focused on nano-bio interfaces and nanoparticle-enabled control of coagulation, leading to first-author papers and a patent. Her Ph.D. in Prof. Lee Gehrke's group applied bioengineering and nanotechnology to build rapid lateral flow assays for tropical viruses, resulting in multiple publications, four patents and the creation of two diagnostics startups (IDX20 and E25Bio); key monoclonal antibodies from this work are now commercial reagents at MilliporeSigma.

From 2017 to 2025 she was a postdoctoral researcher and then Scientist II at the Wyss Institute at Harvard University, in Prof. James J. Collins' and Prof. George M. Church's groups. There she led or co-led work on CRISPR-based diagnostics, CRISPR-responsive smart materials, RNA-responsive translational control in eukaryotes, and high-throughput evolution of fluorogenic amino acid sensors. In parallel, she drove technology-development projects AminoX and Sparkle, which expanded genetic code expansion to create covalent protein therapeutics and binding-activated biosensors. Overall, she has co-authored 28 peer-reviewed publications (13 as first author) and is co-inventor on 15 patents and applications.

Since 2023, Helena has been President, Co-founder and CEO of ExtRNA Biosciences (USA), where she leads a 10-person R&D team developing protein and peptide therapeutics, research tools and cosmetic actives using genetic code expansion. Under her leadership, ExtRNA has secured three research contracts totalling \$3.65M, with Helena as PI or co-PI and signatory. She also serves as R&D Officer for IDX20. Her entrepreneurial work has been recognised through programmes and awards such as the MIT 100K Launch Audience Choice Award, MassBioDrive and Nucleate Bio.

Helena has demonstrated strong capacity to attract competitive funding: she was PI of an NIH CFAR Early Stage Investigator grant and key technology lead on several major projects at the Wyss Institute (including AminoX, Sparkle and COVID diagnostics). She has held multiple prestigious fellowships during her training and has been invited to speak at international conferences in diagnostics, synthetic biology and materials science. She reviews for high-impact journals and acts as a grant reviewer for Mexico's CONACYT.

In terms of training and mentoring, Helena has supervised and examined Master's theses at Vrije Universiteit Amsterdam and Institut Químic de Sarrià, and taught as a Teaching Assistant in MIT's HST.426 course on medical device innovation. Her career is strongly international, with long-term experience in Spain and the USA and extensive collaborations in Latin America and India for field validation of diagnostics. Together, these achievements demonstrate a profile that combines scientific excellence, technology transfer, leadership and internationalisation, well aligned with the objectives of the Ramón y Cajal programme.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: GODEAU, AMÉLIE LUISE
Referencia: RYC2025-055837-I
Correo Electrónico: agodeau@ibecbarcelona.eu
Título: Physics of Cell Migration, Morphogenesis, and Implantation

Resumen de la Memoria:

My research traces a continuous line of investigation into how cells and tissues generate, transmit, and interpret physical forces as they move, reorganize, and invade. Trained as a biophysicist, I have progressed from examining force generation in single migrating cells, to uncovering mechanical coordination across tissues during morphogenesis, and ultimately to dissecting mechanical regulation of human implantation.

I began my scientific path with an MSc in Biophysics at the Technical University of Kaiserslautern (2012), where I worked with Prof. Egbert Oesterschulze on integrating hydrogels into microresonators for ultrasensitive mass measurements. This introduced me early to quantitative biophysics, engineering-based assay development, in the microengineering field.

During my PhD in Cell Physics at IGBMC, Strasbourg (2012–2016) with Dr. Daniel Riveline and Prof. Albrecht Ott, I investigated how cells overcome geometric and mechanical constraints to achieve persistent 3D migration. To address this, I developed fluorescent cell-derived matrices (CDMs) for traction force microscopy—now widely adopted and published as a methods paper. My first-author eLife paper (2022) revealed that oscillatory traction forces act as an intrinsic compass for directed migration in fibrous CDMs, establishing a biophysical mechanism that guided the next phase of my research. Collaborations with theorists Dr. Marco Leoni and Dr. Pierre Sens further strengthened my integrative approach at the interface of physics and cell biology.

In my first postdoctoral position at the CRG, Barcelona (2016–2019) with Dr. Jérôme Solon, I shifted to tissue-scale mechanics and morphogenesis. There, I uncovered a transient contractile seam that coordinates forces across adjoining epithelial tissues during *Drosophila* development (Nat Commun, 2025). This work revealed that multi-tissue mechanical coupling, rather than isolated epithelial mechanics, shapes morphogenetic outcomes—a conceptual transition that directly informed my later focus on invasive behavior in complex multicellular environments.

At IBEC, Barcelona (2019–present) with Dr. Samuel Ojosenegros, I moved into mammalian implantation and reproductive health, examining how mechanical forces govern early developmental invasion. As lead and co-corresponding author (Science Advances, 2025), I reported the first live visualization of human embryo invasion, identifying species-specific invasion strategies driven by traction forces. In parallel, I contributed to metabolic profiling of mouse oocytes and embryos (PNAS, 2024), co-authored a review on implantation models (Hum Reprod, 2021), co-supervise a PhD student developing microfluidic platforms for human embryo implantation.

Across three countries (Germany, France, Spain) and leading research centers (IGBMC, CRG, IBEC), my work has followed a coherent investigative trajectory—from single-cell mechanics (cell physics) to force coordination in developing tissues (morphogenesis) to mechano-metabolic control of mammalian implantation. This sustained line of inquiry demonstrates my ability to identify unifying physical principles of invasive behavior, integrate physics with reproductive biology, and build interdisciplinary collaborations.

Resumen del Currículum Vitae:

My research investigates how cells and tissues generate and respond to physical forces during migration, morphogenesis, and implantation. Trained as a biophysicist, I progressed from single-cell migration to tissue-level mechanics and reproductive biology, integrating mechanobiology with metabolic profiling. This positions me to lead an independent program on the mechano-metabolic regulation of endometrial cell migration in endometriosis, where hormonal cues, mechanical forces, and metabolism converge to drive pathological invasion.

I obtained my MSc in Biophysics at the Technical University of Kaiserslautern (2012), working with Prof. Egbert Oesterschulze on integrating hydrogels into microresonators for sensitive mass measurements, and gained early mentoring experience teaching applied physics practicals.

During my PhD at IGBMC, Strasbourg (2012–2016) under Dr. Daniel Riveline and Prof. Albrecht Ott, I studied how cells overcome spatial constraints to achieve persistent 3D migration. I developed fluorescent cell-derived matrices (CDMs) for traction force microscopy, now widely used, and published this as a methods paper. My first-author eLife paper (2022) showed oscillatory traction forces drive directional migration in fibrous CDMs. Collaborations with theorists Dr. Marco Leoni and Dr. Pierre Sens enhanced my ability to integrate physics and biology.

For my first postdoc at CRG, Barcelona (2016–2019) with Dr. Jérôme Solon, I studied tissue mechanics in *Drosophila*, revealing a transient contractile seam coordinating epithelial forces (Nat Commun, 2025). This highlighted multi-tissue interactions relevant to endometriosis and strengthened my collaborative, interdisciplinary, and mentoring experience.

At IBEC, Barcelona (2019–present) with Dr. Samuel Ojosenegros, I study mammalian embryo implantation and metabolism. As lead and co-corresponding author in Science Advances (2025), I reported the first live visualization of human embryo invasion, revealing species-specific strategies driven by traction forces. I developed collagen-based matrices and force-mapping tools applicable to endometriosis, contributed to metabolic profiling (PNAS, 2024), co-authored a review on implantation models (Hum Reprod, 2021), cosupervise a PhD student developing microfluidic platforms, mentor students, and contribute to project writing.

Across three countries (Germany, France, Spain) and leading research centers (IGBMC, CRG, IBEC), I have transitioned systems—from single-cell migration to tissue mechanics to mammalian implantation—while focusing on force regulation of invasive behaviors. I have published in high-impact journals, collaborated with theorists and clinicians, and gained teaching and leadership experience. This trajectory demonstrates independence, adaptability, and the ability to deliver translational research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: LEYVA DÍAZ, EDUARDO
Referencia: RYC2025-056971-I
Correo Electrónico: eleyva@umh.es
Título: Dissecting neuronal identity across evolution

Resumen de la Memoria:

My research career focuses on how transcriptional networks establish and maintain neuronal identity, combining developmental neurobiology, *C. elegans* genetics and cell reprogramming. During my PhD at the Instituto de Neurociencias (CSIC-UMH) with Dr. Guillermina López-Bendito, I dissected molecular mechanisms guiding thalamocortical axons in the mouse brain. I showed how combinations of guidance cues shape thalamocortical topography and how specific receptor interactions tune responses to Netrin-1, and co-authored a review on the development of major forebrain connections. In the final phase of my PhD I helped establish a line on astrocyte-to-neuron reprogramming with Prof. Benedikt Berninger, demonstrating conversion of thalamic astrocytes into projection neurons and triggering my long-term interest in neuronal identity.

For my postdoctoral training I joined Prof. Oliver Hobert's laboratory at Columbia University with an EMBO Long-Term Fellowship, shifting to *C. elegans* neurogenetics. I led projects on the maintenance of neuronal identity and on pan-neuronal gene regulation, including the characterization of pals-22 as a regulator of repetitive DNA and behavior, and the discovery that CUT homeobox genes cooperate with neuron-type-specific terminal selectors to control pan-neuronal gene expression. These studies, together with additional collaborations, yielded multiple first and corresponding author publications and were run with substantial autonomy within HHMI-funded research lines. At Columbia I also built an international network, mentored students and research assistants, and consolidated expertise in CRISPR/Cas9 editing, reporter-based approaches and next-generation sequencing.

In 2023 I returned to Spain as a Marie Skłodowska-Curie Fellow at the Instituto de Neurociencias, where I now lead an independent program as junior group leader funded by a CIDEAGENT grant. My group has established *C. elegans* as a new model at the institute and implemented multiomics and tissue-specific neuronal isolation workflows. As PI I have published a Genes & Development article showing how a CELF-family RNA-binding protein controls a binary splicing switch that segregates a pan-neuronal CUT transcription factor from a non-neuronal Golgi protein, and authored a review on CUT genes and neuronal specification. I hold R3 certification from the Spanish Research Agency, supervise PhD and Master's students, co-organize CeNEURO 2026 and contribute to editorial, evaluation and outreach activities, reflecting a consolidated trajectory toward independence and leadership.

My research line now aims to decode how CUT homeodomain transcription factors and master regulators cooperate to control neuronal identity and to explore their use in direct reprogramming approaches. Using integrated multiomics in *C. elegans* and mouse, I will define the logic of CUT-terminal selector cooperation, test its conservation in mammalian neurons and evaluate whether combining CUT factors with neuron-type-specific transcription factors improves astrocyte-to-neuron reprogramming. This program is designed to reveal general principles of neuronal identity control conserved across evolution.

Resumen del Currículum Vitae:

Since August 2023, I have led an independent research team at the Instituto de Neurociencias (CSIC-UMH), where my group investigates the molecular mechanisms that control neuronal identity using complementary *C. elegans* and vertebrate models. We have established *C. elegans* as a new experimental system at the institute and implemented multiomics and tissue-specific neuronal isolation workflows that underpin my current research program. My laboratory is funded by a CIDEAGENT grant and my status as an established researcher is recognized by R3 certification from the Spanish Research Agency (AEI). As an independent PI I have published a research article in Genes & Development on alternative splicing and neuronal fate determinants as sole corresponding author, and a review on CUT homeobox genes in Frontiers in Cellular Neuroscience as sole author and corresponding author. These achievements, together with invited talks and growing collaborations, highlight the rapid consolidation of my research line and my emerging leadership in the neuronal identity field.

My trajectory in developmental neurobiology began with my PhD at the Instituto de Neurociencias under the supervision of Dr. Guillermina López-Bendito, funded by a CSIC Predoctoral Fellowship. I identified molecular mechanisms governing thalamocortical axon development in the mouse brain, combining in vivo genetics, biochemistry and functional assays, and revealed how axon guidance cues are integrated to build complex forebrain circuits, resulting in publications in Current Biology. After my PhD I helped establish an innovative research line on astrocyte-to-neuron reprogramming in collaboration with Prof. Benedikt Berninger, leading to a Science Advances article and sparking my long-term interest in neuronal identity and its transcriptional control.

In 2015 I joined Prof. Oliver Hobert's laboratory at Columbia University with an EMBO Long-Term Fellowship, where I became proficient in *C. elegans* genetics, CRISPR/Cas9 genome editing, next-generation sequencing and sorting-based approaches. My postdoctoral work included projects on the maintenance of neuronal identity and on the regulation of pan-neuronal gene expression, demonstrating how CUT homeobox genes cooperate with neuron-type-specific transcription factors to control neuronal programs, synaptic function and behavior. During this period I contributed to more than ten peer-reviewed publications and progressively took full responsibility for experimental design, data interpretation, manuscript drafting and strategic planning.

To date I have authored 24 peer-reviewed articles, including six as corresponding author (three as sole corresponding). I have secured competitive funding such as EMBO fellowships, a Marie Skłodowska-Curie Postdoctoral Fellowship, an Ayuda María Zambrano and the CIDEAGENT grant that supports my current group. I have presented my work at major international conferences (SfN, FENS, International *C. elegans* Meeting), delivered invited seminars at leading institutions, and co-organize CeNEURO 2026, the next international *C. elegans* neurobiology meeting. I supervise PhD and Master's students, teach a doctoral course on behavior in neuroscience, regularly review manuscripts for international journals, and act as evaluator for national AEI calls, reflecting my leadership and service to the scientific community.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: LOPEZ TELLO, JORGE
Referencia: RYC2025-054587-I
Correo Electrónico: jorgelopeztello90@gmail.com
Título: Placental Origins of Health and Disease

Resumen de la Memoria:

My research career has been defined by a longstanding commitment to understanding how pregnancy shapes lifelong health in both mothers and offspring. Although pregnancy is protective for some conditions, it also increases the maternal risk of later-life cardio-metabolic disease, yet the mechanisms linking gestation to long-term physiological change remain poorly defined. My laboratory seeks to fill this critical gap by uncovering how the placenta orchestrates maternal metabolic adaptation, fetal development, and post-pregnancy health trajectories. Through this work, we aim to identify new biomarkers, mechanistic pathways and therapeutic strategies that can improve clinical management of pregnancy-associated disorders.

Trained across multiple international centres, including the University of Cambridge, and supported by multiple fellowships including Royal Society, Wellcome Trust and currently a competitive César Nombela Fellowship, my research integrates in vivo models, cell-specific genetic approaches, CRISPR/Cas9 tools, and advanced metabolic and molecular analyses.

My career is supported by 35 peer-reviewed publications, including first and corresponding author papers in leading journals, including Cell Metabolism, PNAS, Developmental Cell or Molecular Metabolism.

My research lines are:

☐ Maternal nutrition and feto-placental growth: I have investigated how maternal under- and over-nutrition influence placental development, nutrient transport and fetal organogenesis. These studies revealed how mothers prioritise their own metabolic homeostasis during nutritional stress and uncovered new links between over-nutrition, placental ferroptosis, and altered fetal growth.

☐ Maternal gut microbiota as a regulator of placental and fetal development: As first and corresponding author of a series of papers, I demonstrated that the maternal gut bacterium *Bifidobacterium breve* remodels maternal physiology, placental endocrine and nutrient-transport pathways, and enhances fetal metabolic and neural development. These discoveries established maternal microbial modulation as a promising therapeutic avenue.

☐ PI3K-p110 α ; as a central regulator of maternal-fetal resource allocation: Using genetic mouse models, I defined how PI3K-p110 α shapes maternal metabolic adaptation to pregnancy and drives placental morphology, nutrient transport, and fetal growth. This work has provided mechanistic insight into fetal growth restriction and gestational metabolic dysfunction.

☐ Placental imprinting genes and lifelong metabolic health: My recent work revealed that selective manipulation of the Igf2-H19 locus within placental endocrine cells disrupts maternal metabolic adaptation, alters placental endocrine output, and generates lasting metabolic consequences in both mothers and offspring. This research highlights the placenta as an active regulator of maternal physiology, not simply a fetal support organ.

My current research programme explores whether early-life metabolic disturbances, particularly childhood obesity, leave persistent “metabolic memories” in maternal organs that later impair placental endocrine function and increase the risk of gestational diabetes. This is an urgent and growing public-health challenge and seeks to clarify how developmental metabolic exposures shape female reproductive outcomes.

Resumen del Currículum Vitae:

Jorge López-Tello (JLT) is a Principal Investigator (R3, Biotechnology, Call 2024) internationally recognised for his expertise in the environmental control of placental physiology and its relevance for long-term health. He has developed novel animal models, physiological experimentation and state-of-the-art molecular approaches to generate unique insights into the relationships between the mother, placenta and fetus that determine pregnancy success and lifelong metabolic outcomes. His work has major translational implications for understanding, diagnosing and preventing pregnancy complications and their associated health risks worldwide. It highlights the influence of lifestyle factors (malnutrition, obesogenic diets), microbiota composition and imprinted gene regulation. His research has attracted global media coverage (>350 mentions), including La Sexta, Diario Nutrición, BBC News, Onda Cero and Nature Reviews Endocrinology.

His contributions have been recognised through multiple honours, including three major independent fellowships (Newton Royal Society Fellowship 2018; Sir Henry Wellcome Postdoctoral Fellowship 2020; César Nombela Fellowship 2023), the Royal Society Newton Alumni Award (2024), the Physiological Society Professional Development Award (2023), the SRF Postdoctoral Scientist Award (2022), the SRI President’s Plenary Award (2021), the Early Career Society for Endocrinology Award (2019) and the Premio Extraordinario de Doctorado (2018).

JLT has established strong national and international collaborations (UK, Brazil, USA, Chile, Germany, Belgium) and is deeply committed to teaching, mentoring and fostering an inclusive and supportive research environment. As an advocate for diversity and inclusion, he actively supports young scientists, including those from underrepresented countries and the LGBTQ+ community. He also participates in public outreach activities such as “Noche de los Investigadores” and the Cambridge Science Week Festival, and contributes to public-facing scientific communication through articles in The Conversation, the Physiological Society and Genotipia.

Markers of research esteem (selected):



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

- ☑ 35 JCR-indexed peer-reviewed publications (15 co/first author; 12 co/corresponding author; h-index 22), 6 review articles, 2 book chapters, >1,700 citations.
- ☑ 78 conference abstracts (>20 as first author) and invited talks at international conferences and universities (e.g., University of Pennsylvania, University of Melbourne, KU Leuven).
- ☑ Competitive funding from multiple countries (EU COST Actions; USA Burroughs Wellcome Fund; Brazil CAPES; UK Royal Society & Wellcome Trust).
- ☑ Reviewer for >30 journals and multiple international funding agencies; editorial roles in Veterinary Sciences and Frontiers in Cell and Developmental Biology.
- ☑ Supervision of >14 students, with several receiving international recognition.
- ☑ Selected as one of 20 worldwide for the prestigious Frontiers in Reproduction course (Boston, USA).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: GONZÁLEZ RELLÁN, MARÍA JESÚS
Referencia: RYC2025-056562-I
Correo Electrónico: chusa.gzlz.rellan@gmail.com
Título: Metabolic mechanisms driving chronic disease: from liver to cardiovascular protection
Resumen de la Memoria:

I am a biomedical researcher with a solid track record in metabolism, molecular biology and physiology, author of 21 peer-reviewed publications (9 first-author, 2 corresponding author; h-index 13, 650 citations). My scientific trajectory has consistently focused on uncovering fundamental mechanisms linking cellular stress, metabolic rewiring and chronic disease.

During my PhD (2015–2021, FPI Fellowship), I discovered previously unrecognised metabolic functions of the TP53 family in hepatic nutrient sensing and glucose homeostasis, generating 3 first-author papers in Nature Communications, Journal of Hepatology and Gut, and additional co-authorships in Hepatology and Molecular Metabolism. My postdoctoral stage at CIMUS expanded this mechanistic work to post-transcriptional regulation (O-GlcNAcylation, Neddylation) in MASLD/T2D, yielding 4 first-author papers, including Cell Metabolism and Cell Reports Medicine, and two corresponding-author articles that consolidated early scientific independence.

Since 2022, as an MSCA Global Fellow in Daniel Drucker's laboratory (Toronto), I have pioneered the discovery that hepatic LSECs express GLP-1R and are indispensable for semaglutide-induced resolution of MASH independently of weight loss, work now in minor revision at Cell Metabolism. These findings align with ESSENCE phase-3 outcomes and provide a new conceptual framework for the direct, weight-independent tissue-protective actions of GLP-1 medicines. I have been invited to highlight these advances in Cell Reports Medicine and JAMA, and have initiated independent lines on GLP-1-mediated inflammation and atherosclerosis, supported by CIHR, Eli Lilly and my MSCA fellowship.

My research programme for the Ramón y Cajal contract will establish an independent line centred on deciphering direct and indirect weight-loss-independent mechanisms of GLP-1 action in cardiovascular disease, with emphasis on vascular smooth muscle cells (VSMC) as key mediators of atheroprotection. Combining single-cell and proteomic profiling, advanced mouse genetics and vascular physiology, I aim to define how GLP-1R activation preserves VSMC phenotype, reshapes VSMC–endothelial–immune communication, and limits vascular inflammation and plaque progression. This programme will seed in Spain a unique, highly translational niche aligned with next-generation incretin-based therapies and will position my group for national funding, Young Investigator awards and an ERC Starting Grant.

Resumen del Currículum Vitae:

I am the author of 21 peer-reviewed publications, including 9 as first author and 2 as corresponding author, with an h-index of 13, i10-index of 16, and 650 citations. My research focuses on the molecular mechanisms linking metabolic rewiring, inflammation and chronic disease.

I completed my PhD (2015–2021, FPI Fellow) in Dr Rubén Nogueiras' laboratory (University of Santiago de Compostela), where I uncovered previously unrecognised metabolic functions of the TP53 family in hepatic nutrient sensing, glucose homeostasis and insulin signalling. This work generated 11 publications, including first-author articles in Nature Communications, Journal of Hepatology and Gut. I complemented my training with internships at CNIC (G. Sabio) and CIC bioGUNE (M.L. Martínez-Chantar), and my thesis was awarded *summa cum laude*.

As a postdoctoral researcher at CIMUS (2019–2020), funded by La Caixa Health Research Project and RETOS, I investigated how O-GlcNAcylation and Neddylation regulate gluconeogenesis, mitochondrial function and MASLD/T2D progression. This stage produced 8 publications, including first-author papers in Cell Metabolism, Molecular Metabolism, Cell Reports Medicine and Frontiers in Endocrinology, with two corresponding-author contributions demonstrating early scientific independence.

In 2022, I joined Dr Daniel Drucker's laboratory (Lunenfeld-Tanenbaum Research Institute, Toronto) as an MSCA Global Fellow to investigate how GLP-1 medicines improve MASH. Using multi-omics and genetic models, I discovered that hepatic LSECs express GLP-1R and that their activation is essential for semaglutide-induced MASH resolution independently of weight loss. This work, in minor revision at Cell Metabolism, offers a mechanistic explanation aligned with ESSENCE phase-3 data. I was subsequently invited to discuss these advances in Cell Reports Medicine and JAMA. I have also launched independent lines on GLP-1-mediated anti-inflammatory and anti-atherogenic mechanisms (funded by CIHR, Eli Lilly and my MSCA fellowship).

I have secured highly competitive funding, including the BBDC–Eli Lilly Fellowship (2022), the Government of Galicia Postdoctoral Fellowship (2022), and the Marie Skłodowska-Curie Global Fellowship (2023; score 99.2/100; top four in the Health Sciences panel). I have received 14 scientific awards, including distinctions from SEEN, SEBBM, the Antoni Esteve Foundation and the Royal Academy of Sciences of Galicia.

I frequently review for leading journals (Nature Communications, Cell Metabolism, EMBO Journal, Metabolism, Diabetes), and have served for over 10 years on the USC Master in Biomedical Research Council. My dissemination activities include >13 international presentations (Nature Conferences, International Liver Congress, Dana-Farber Cancer Institute, LTRI), in addition to supervising 3 end-of-degree theses, participating in doctoral committees, organising outreach events and delivering high-school science lectures.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: LATORRE CRESPO, ERIC
Referencia: RYC2025-054637-I
Correo Electrónico: eric.latorrecrespo@gmail.com
Título: Biological Aging - Mathematical Models of Aging from a Systems Biology Approach
Resumen de la Memoria:

I currently hold a Group Leader position with dual affiliation between the Centre de Recerca Matemàtica (CRM) and Centre de Regulació Genòmica (CRG) at the Barcelona Collaboratorium for Mathematical Modelling and Predictive Biology. My research sits at the intersection of systems biology and mathematical modeling, focusing on cellular aging and its implications for cancer and age-related diseases. I develop biologically-informed mathematical models to quantify aging hallmarks in the hematopoietic system, aiming to predict disease risk and uncover fundamental mechanisms regulating lifespan.

My scientific trajectory exemplifies strategic cross-disciplinary mobility. After completing my PhD in Fourier Analysis at ICMAT (Universidad Autónoma de Madrid, 2013-2018) under Antonio Córdoba, I recognized the translational potential of rigorous mathematical frameworks and transitioned to biomedical research.

In 2019, I secured a 4-year Cross-Disciplinary Fellowship at the University of Edinburgh, bridging the Institute of Genetics and Cancer with the School of Informatics. This independent position enabled me to establish two pioneering research lines:

Research Line 1: Clonal Hematopoiesis of Indeterminate Potential (CHIP).

I developed mathematical frameworks combining ecological models with Bayesian inference to detect and analyze longitudinal evolution of somatic mutations in blood at pre-clinical stages. Using targeted error-corrected sequencing on blood samples of individuals at old age, I established that gene-specific fitness differences enable patient stratification and introduced clinical follow-up guidelines (Nature Medicine, 2022). Subsequently, I coordinated the largest international CHIP collaboration, unifying cohorts from the UK, US, and Italy, demonstrating how mutation timing, fitness, and clonal structure jointly determine clinical progression. I developed predictive biomarkers of all-cause mortality and developed robust frameworks for personalized medicine approaches adopted in clinical settings for managing therapy-related mutations.

Research Line 2: Epigenetic Aging from a Cellular Mechanics Perspective.

Building on insights from CHIP, I developed an epimutation model conceptualizing age-related methylation changes as stochastic events during cell replication. This framework produced three publications: First, ProbAge, the first mechanistic epigenetic clock separating aging acceleration from methylation bias (Nature Aging, 2024); Second, a power law relating DNA methylation rates to maximum lifespan across mammalian species (Nature Aging, 2024), suggesting stem cell replication as an upstream regulator of aging speed; Third, demonstrating that the ratio between stem cells and their division rate decreases inversely with maximum lifespan, positioning this mechanism as a major regulator of hallmarks including telomere shortening, somatic mutations, and epigenetic aging.

Since December 2024 at the Barcelona Collaboratorium, I am establishing two new directions: (1) Single-cell epigenetic aging in CHIP, investigating whether distinct clones age epigenetically at different rates and whether this predicts malignant transformation; (2) DNA sequence determinants of epigenetic fidelity, leveraging large language models to identify genomic regions resistant to epigenetic drift.

Resumen del Currículum Vitae:

As a cross-disciplinary researcher, I combine mathematical modeling with systems biology to understand cellular aging and its implications for cancer and age-related diseases. My career demonstrates strategic international mobility and progressive scientific independence.

Education and Early Career:

I completed my undergraduate degree at Universitat de Barcelona (2008-2012), MSc at the University of Bristol (2012-2013) specializing in Number Theory and Harmonic Analysis, and PhD in Harmonic Analysis from Universidad Autónoma de Madrid (2013-2018) under Antonio Córdoba at ICMAT. During my PhD, I spent two years at the Maxwell Institute for (University of Edinburgh) where I discovered the translational potential of mathematics to biomedical research.

Independent Postdoctoral Career:

In 2019, I secured a 4-year Cross-Disciplinary Fellowship at the University of Edinburgh, bridging the Institute of Genetics and Cancer with the School of Informatics. I established myself in biological aging research, securing my own research project grant as principal investigator and playing a central role in writing a successful European Hematology Association bilateral grant. This EHA grant provided my employment at the CRUK Scotland Institute at the University of Glasgow (2023-2024), where I coordinated the largest longitudinal CHIP cohort to date, building an international collaborative network spanning the UK, US, and Italy.

Current Position and Leadership:

Since December 2024, I hold a Junior Group Leader position with dual CRM-CRG affiliation at the Barcelona Collaboratorium. This position, formalized through a scientific collaboration agreement, tasks me with knowledge transfer and establishing a new research line on mathematical models of aging. I direct PhD students at CRG and organize the Collaboratorium's Seminar Series, bridging mathematical and biological communities in Barcelona.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Scientific Output and Collaboration:

My research has produced first and corresponding author publications in Q1 journals including Nature Medicine and Nature Aging, with impact extending beyond traditional academic metrics. My modeling frameworks have been adopted by clinical groups internationally and attracted collaborations with leading institutions including Harvard Medical School and the Mayo Clinic. I maintain strong commitment to open science through publicly available software tools that are actively used by other researchers, open access publications, and proper data management. My commitment to the scientific community extends to training the next generation through supervision of MSc and 3 PhD students, and maintaining scientific rigor as reviewer for journals including Nature Aging and Aging Cell. I also actively engage in public outreach activities, and my research has achieved significant media visibility, with publications featured in news outlets and reaching wide audiences through social media.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología

Nombre: LITSIOS, ATHANASIOS

Referencia: RYC2025-055128-I

Correo Electrónico: at.litsios@gmail.com

Título: Single-cell systems biology

Resumen de la Memoria:

I am a Research Associate at the Donnelly Centre of the University of Toronto mentored by Profs. Brenda Andrews and Charles Boone. My long-term research goal is to gain a quantitative understanding of how a eukaryotic cell functions as a system, with a focus on proteome and organelle homeostasis. My research employs single-cell phenomics, which entails acquiring multi-parametric phenotypic information from millions of live cells through the integration of high-throughput genetics, automated microscopy, and computational analysis.

I obtained my PhD with Prof. Matthias Heinemann at the Department of Molecular Systems Biology of the University of Groningen. Using microfluidics and live-cell imaging to monitor the dynamics of metabolism, protein synthesis, and growth in single cells, I discovered a mechanistic model for cell cycle commitment in the unicellular eukaryote budding yeast (Litsios et al., Nat. Cell. Biol. 2019). During my postdoctoral training at the Donnelly Centre of the University of Toronto, I led an interdisciplinary effort that applied single-cell phenomics in the same model organism to generate the first highly-resolved genome-scale annotation of protein localization changes during the eukaryotic cell cycle (Litsios et al., Cell 2024). By combining automated microscopy with the application of two distinct convolutional neural networks for image analysis, this work led to the establishment of a methodological pipeline for image-based spatiotemporal proteomics that enables the study of proteome dynamics with a resolution of ~20 distinct subcellular localization classes (Litsios et al., STAR Protocols 2025).

Building on these experiences, my independent research group will study the various processes that comprise the proteome homeostasis network in an integrative way in single-cells, and at the genome scale, to understand [1] how proteome homeostasis is mechanistically maintained as a systems-level property, and [2] how its status affects organelle and overall cell function during health, aging, and disease. I will employ a top-down approach using budding yeast where single-cell phenomics experiments can be performed at scale, followed by targeted experimentation in mammalian systems. This program will aim to advance cell biology by establishing a foundational understanding of how proteome homeostasis arises from the integrative activity of its constituent processes, while in parallel generate actionable insights for biomedicine and biotechnology.

Resumen del Currículum Vitae:

I did my undergraduate studies in Biology at the Aristotle University of Thessaloniki (Greece). In parallel, I carried out two research projects with Prof. Peter Eckl at the University of Salzburg (Austria), studying ferroptosis in primary rat hepatocytes using fluorescence microscopy. My emerging interest in single-cell biology prompted me to pursue a doctorate degree as a Marie-Curie ITN Fellow with Prof. Matthias Heinemann at the University of Groningen, where I worked with microfluidics and live-cell imaging on budding yeast. There, I discovered a mechanistic model for cell cycle commitment, showing that increase in glycolysis triggers the G1/S transition by boosting translation and raising the levels of Cln3 – the most upstream activator of the cell cycle program (Litsios et al., Nat. Cell Biol. 2019; Litsios et al., MBoC 2022).

For my postdoctoral training I joined the group of Profs. Brenda Andrews and Charles Boone at the Donnelly Centre. There, I led a study that characterized the changes in the localization and abundance of the complete yeast proteome as a function of the cell division cycle (Litsios et al., Cell 2024). This comprised the first genome-scale annotation of protein localization changes during the cell cycle of any eukaryotic cell, and achieving it involved the development of a high-content screening pipeline that enabled the study of proteome dynamics in live single cells with resolution of ~20 distinct subcellular localization classes (Litsios et al., STAR Protocols 2025). The project led to the generation of several complementary genome-scale resources, for the effective dissemination of which I co-developed an open-access webtool (thecellvision.org/cellcycle/).

In addition to research, I have taught undergraduate and graduate level courses at the University of Groningen (2014-2017) and I have mentored trainees across academic levels at the University of Toronto (2021-present). Moreover, I have assumed various leadership roles in science communication and community engagement. I was a national winner of the globally established science communication competition FameLab (2009) and have since served as a jury member for several of its European events (2012, 2014, 2021). Additionally, I led the programming team for Science Rendezvous at the University of Toronto (2023), Canada's largest scientific festival. I co-organized the annual symposium of the Donnelly Centre (2024), as well as the institute's mini-symposium series for its postdoctoral trainees (2025). Moreover, I have given several talks in scientific meetings, including an invited talk at Cornell's Weill Institute (2025), a selected talk at MIT and Harvard's Broad Institute (2025), and selected talks at international yeast conferences (2021, 2023, 2025). Furthermore, my research has involved multiple international collaborations with colleagues in institutions at the United States, Switzerland, Germany and Sweden.

Finally, my postdoctoral research has been supported with a fellowship from the Canadian Institutes of Health Research, and my academic contributions have been recognized with various distinctions, including the Donnelly Centre Research Excellence Award (University of Toronto, 2024), the DeLill Nasser Award (Genetics Society of America, 2025), and the Weill Institute Emerging Scholars Award (Cornell University, 2025).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: ROIG PUIGGROS, SERGI
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Título: Evolutionary adaptation through emerging connectivity: input-driven neuronal diversification.

Resumen de la Memoria:

My research has focused on understanding the molecular mechanisms underlying neural circuit formation and neuronal identity acquisition in both normal and pathological brain development, progressively transitioning from developmental mechanisms to evolutionary principles. During my PhD, I investigated the role of Netrin-1 in commissural axon guidance and pre-cerebellar neuron migration. The classical model posited that ventral midline-derived Netrin-1 acts as a long-range chemoattractant in the spinal cord. Using in vivo genetic ablation, we demonstrated that ventricular-zone-derived Netrin-1 is necessary and sufficient for commissural axon guidance in the hindbrain. Coupling genetic tools with 3D light-sheet microscopy, we revealed that in the spinal cord, both Netrin-1 sources act synergistically, establishing ventricular-zone-derived Netrin-1 as an evolutionary adaptation for guiding neurons through larger brain regions. We further proposed a new role for Netrin-1 in confining commissural axons and migrating neurons within the central nervous system—not through peripheral repulsion, but by creating a permissive growth environment. During my postdoc, I have investigated the interplay between cell-intrinsic mechanisms and environmental cues in shaping neuronal identity. Using genetic mouse models of cortical malformations, I demonstrated that cortical neuron identity and function are largely independent of spatial location. Remarkably, misplaced subcortical neurons maintain appropriate molecular identities and can assume cortical functions when the overlying cortex is inhibited, revealing robust cell-intrinsic developmental programs. Complementing this, I have shown through multiple projects that while neurons possess strong intrinsic identity programs, environmental inputs—including sensory experience and connectivity—are essential for complete maturation. This work, spanning in vitro development, cortical arealization, and experience-dependent maturation, establishes fundamental principles about how the interplay between intrinsic programs and extrinsic signals shapes neuronal diversity and circuit formation. Building on this integrated expertise in developmental mechanisms, circuit formation, and cutting-edge molecular technologies, I now aim to investigate evolutionary circuit adaptation. Specifically, I will examine how pre-existing ponto-cerebellar circuits responded to mammalian neocortical expansion and corticospinal tract emergence. The pontine nuclei exhibit remarkable anatomical and molecular diversity in mammals compared to other vertebrates, suggesting that emerging cortical inputs drove pontine neuron diversification. By combining comparative transcriptomics across vertebrates (mammals, birds, reptiles) with genetic manipulation of cortical inputs, I will identify which pontine neuron subtypes represent recent evolutionary acquisitions dependent on cortical connectivity. Furthermore, using multi-omic approaches during critical postnatal development, I will reveal the gene regulatory networks that mediate input-dependent pontine neuron maturation. This work will establish fundamental principles about how emerging circuit connectivity drives neuronal diversification during evolution—insights with broad implications for understanding circuit plasticity, regeneration, and neurodevelopmental disorders affecting motor pathways.

Resumen del Currículum Vitae:

After obtaining my degree in Molecular Biotechnology (2015, Universitat de Barcelona), I completed my Developmental Biology international MSc between Paris and Lyon (France). I then started my PhD in Dr. Alain Chédotal's laboratory at the Institut de la Vision with a French Ministry of Higher Education fellowship (2016). I focused on molecular mechanisms orchestrating commissural axon guidance, particularly Netrin-1 sources and their role in midline crossing. My work led to 5 research articles (2 as co-first author in *Neuron* and *Development*) and 1 review. I also obtained the Young Investigator Prize from the Fondation des Treilles (2019) for my research proposal on transcriptional diversity of commissural neurons. After obtaining my doctorate (12-2019), I joined Pr. Denis Jabaudon's laboratory at the Centre Médical Universitaire, University of Geneva (Switzerland), with a competitive EMBO Long-Term Fellowship to investigate areal diversity of cortical neurons. I expanded my axon guidance and developmental neuroanatomy background by specializing in molecular mechanisms controlling neuronal identity emergence, mastering single-cell and spatial transcriptomics, and applying cutting-edge circuit interrogation tools. During this period, I have co-authored 7 research articles (1 as first author in *Nature Neuroscience*, in press), one book chapter, and one *Nature News & Views* commentary. I also serve as lecturer and examiner at the University of Geneva and Paris Descartes Neuroscience Master's, and as an independent reviewer for *eNeuro*. During these years, I have had the chance to supervise several MSc and PhD students, who have successfully pursued their academic career and published in peer-reviewed journals. Drawing from expertise developed during my PhD and postdoctoral training, I aim to establish an independent research program focused on evolutionary mechanisms of neuronal circuit adaptation and diversification. Understanding these fundamental processes will advance knowledge of circuit evolution and plasticity while informing therapeutic strategies for neurodevelopmental disorders.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: MORIANO GUTIERREZ, SILVIA
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Título: Decoding and Engineering Microbial Signals in Host-Microbiota Ecosystems

Resumen de la Memoria:

My research trajectory is built around a simple idea: host-microbiota interactions are not just about “who is there”, but about the molecular signals they exchange. Over the last decade, across different model systems, I have treated symbioses as signalling systems and shown how a few key molecules can reprogramme whole organisms. In my PhD and first postdoc, I showed that a single beneficial symbiont can act as a body-wide organiser of host physiology, producing the first diet- and developmental map of host gene expression driven by one bacterium and helping to establish the squid-Vibrio system as a benchmark model in symbiosis research. I then introduced non-coding RNAs as a fundamental language of mutualism, demonstrating that vesicle-exported bacterial sRNAs and host microRNAs are key regulators of immune trafficking and organ morphogenesis, work that shifted the field from viewing beneficial symbioses as static associations to dynamic, multilayer signalling networks. Building on this, I extended the signalling perspective to complex microbiomes: delivering one of the first functional atlases of the human infant gut microbiota, revealing strong product-specific immunomodulation by fermented foods, and, within NCCR Microbiomes/ETH Zürich, pioneering engineered symbiont biosensors and real-time volatilomics as non-invasive tools to read out microbiota and pathogen states. My current and future research line builds directly on this trajectory and is articulated in my NEUROBAC and SynCBIome projects. I aim to understand and ultimately control how hosts and microbial communities use neurotransmitters and related molecules as shared ecological signals. Current models of the microbiota-gut-brain axis focus on a narrow set of “classic” metabolites; my central hypothesis is that host-derived neurotransmitters (serotonin, dopamine, GABA, catecholamines) and related signals act as dual-use cues: they structure microbial interaction networks (competition, cooperation, biofilms, niche partitioning) and simultaneously modulate host immune, metabolic and neural pathways. Their effects depend on spatial organisation, substrate availability, diet and developmental stage. To tackle this, I will (i) map ecosystem-level responses to neurotransmitters in complex gut communities using meta-omics and, where possible, spatially resolved approaches; (ii) dissect causal mechanisms in defined synthetic consortia and biofilm models using isogenic receptor/transport mutants and controlled signal gradients; (iii) test in vivo relevance in gnotobiotic models colonised with synthetic or human-derived communities, linking microbial signalling states to host metabolic, immune and behavioural readouts; and (iv) develop nutritional and synthetic interventions, from amino acid precursors and dietary components to engineered symbionts and “reporter communities” that convert specific signalling states into measurable outputs in faeces or volatiles. A key strand will focus on how bacterial communities decode and reshape host stress-related signals and how this feeds back on neuroendocrine tone and resilience. By combining engineered bacterial reporters, synthetic communities, behavioural assays and metabolomics, my goal is to build predictive models that connect community-level signalling to host states such as stress susceptibility, recovery and cognitive performance.

Resumen del Currículum Vitae:

My research asks how hosts and their microbiota communicate across scales, from non-coding RNAs to metabolites, and how this signalling can be read and ultimately controlled. I have 19 peer-reviewed publications (7 first-author, 3 corresponding) in journals such as PNAS, PLOS Biology, EBioMedicine, and Microbiome (707 citations; h-index 12). Across model systems, I combine molecular microbiology, multi-omics and synthetic biology to address three questions: (i) how beneficial symbionts reprogramme host physiology; (ii) how microbiota functions adapt across development and diet; and (iii) how native symbionts and their signals can be harnessed for diagnostics and interventions. My early work established key mechanisms in a simple animal-bacteria symbiosis. In a first-author PNAS paper, I produced the first diet- and developmentally resolved map of host gene expression in response to a single beneficial symbiont, revealing body-wide effects of a monospecific microbiota. I then opened a line on non-coding RNAs as a language of mutualism: a first-author PLOS Biology paper showed that a bacterial sRNA in vesicles is required for immune cell trafficking and organ morphogenesis, and a companion mSystems paper (Editor’s Pick) demonstrated that host microRNAs rapidly gate early symbiotic responses. Furthermore, in EBioMedicine, I helped deliver one of the first functional atlases of the human gut microbiota across pregnancy and infancy, showing how diet and development reshape microbial gene expression. As first and corresponding author in Food Research International, I showed that commercial kefir differ widely in bacteria-yeast consortia and immunomodulatory profiles, with direct implications for the design of fermented foods. In addition, I identified neuroactive metabolite classes systematically shaped by the microbiota. Within the NCCR Microbiomes and in collaboration with ETH Zürich, I have also helped move from understanding to engineering, developing an engineered bee gut symbiont as a non-invasive biosensor (PLOS Biology 2024) and a real-time volatilomics approach to diagnose microbiota and pathogen states in bees. I am currently a Severo Ochoa Senior Researcher at IATA-CSIC, where I lead two PI-funded projects, NEUROBAC (Emergent-GVA) and SynCBIome (IMPULSA IATA), on microbial neurotransmitters, synthetic consortia and biosensors. As PI I have secured >€150k in competitive funding (UNIL, SNSF, GVA, CSIC) and, as co-investigator, contributed to >\$7M in major projects (NIH MERIT, NIH R01, INSPIRE). My career spans three countries (USA, Switzerland, Spain), and I maintain an extensive international network, including active collaborations with ETH Zürich, Max Planck Bremen and Carnegie/Caltech, where I am currently a guest affiliate. I supervise three postdocs, co-supervise a PhD student at ETH Zürich, and have supervised seven MSc and twelve BSc students. I have taught ~270 hours of Microbiology (UNIL) and a biochemistry module (UH Mānoa), served on a professor recruitment committee, organised a seminar series, and regularly review for leading journals. I follow open-science practices (public data deposition, code on GitHub) and, having navigated two maternity leaves while maintaining international collaborations, I am strongly committed to an inclusive, high-performing research environment.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
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Referencia: RYC2025-054684-I
Correo Electrónico: paminamwinkler@gmail.com
Título: Deciphering protein interaction dynamics

Resumen de la Memoria:

Dr. Pamina M. Winkler is an interdisciplinary scientist working at the interface of photonics, biophysics, biochemistry and cell biology. With over 745 citations (h-index 8), multiple invited talks and >20 international conference presentations, she has built a strong track record of delivering high-impact research, leading international collaborations, and developing innovative experimental platforms. Throughout her scientific career she has consistently driven projects as (shared) first author, conducting the experimental work, data analysis and manuscript writing, including two publications without her PhD supervisor and one in Nature.

Her early research was rooted in photonics, where she exploited plasmonic and dielectric nanoantenna platforms to study light-matter interactions at the nanoscale. In her PhD, she developed planar photonic nanoantenna arrays enabling giant fluorescence enhancement and single-molecule sensitivity. She established a correlative nanophotonic-FCS-AFM approach that revealed transient nanodomains (~10 nm) in model and living cell membranes—pushing the spatial limits of nanoantenna-based membrane studies. Her two reviews on correlative super-resolution imaging outline a vision that continues to guide her research.

During her postdoc at EPFL, she expanded her expertise toward physical chemistry to quantitatively understand weak protein interactions. She established self-interaction and cross-interaction chromatography combined with surface plasmon resonance studies to quantify the interaction strength of proteins. These efforts culminated in demonstrating that amino acids can efficiently stabilize and modulate weak protein interactions at very low ligand concentrations complemented by a theoretical framework via a collaboration.

Her work embraces FAIR and open-science principles, with raw datasets deposited in institutional servers and with most publications available as open access or preprints. She has gained strong visibility across disciplines, presenting to diverse scientific communities spanning photonics, protein chemistry, biology and materials science.

With the Ramón y Cajal fellowship, Dr. Winkler aims to establish an independent research program centered on protein interaction dynamics across scales, combining her expertise in photonic nanoantennas, advanced fluorescence spectroscopy, AFM, and physical chemistry. Her vision is to develop an innovative correlative toolkit that resolves from the meso- down to the nanoscale, enabling quantitative insight into how proteins interact, diffuse and reorganize, and how small molecules—including non-proteinogenic amino acids—modulate these interaction dynamics.

Her research will pursue two main objectives:

(1) Decipher how non-proteinogenic amino acids such as taurine influence protein shape, aggregation in the weak interaction regime, including their effects on intrinsically disordered proteins and post-translationally modified variants.

(2) Resolve protein interaction dynamics on living cell membranes, focusing on GPCRs and type-II cadherins, by adapting photonic antenna platforms for live-cell super-resolution imaging and nanoscale FCS.

Her aim is to provide an innovative versatile platform for biomolecular dynamic studies in living and more complex systems which will be exploited by fellow researchers of the Spanish research and technology landscape.

Resumen del Currículum Vitae:

My scientific journey has been driven by curiosity for how protein and lipid interactions and dynamics govern spatiotemporal organization and ultimately shape biological function. Coming from a background in experimental physics, I work at the interface between biophysics, biochemistry and bioengineering. My long-term vision is to lead an interdisciplinary group that unravels protein interaction dynamics using correlative approaches, ultimately guiding translational advances in biomedicine and human health.

After completing my Master's in Physics in Graz with my master thesis in collaboration with a group of the Université Paris-Diderot (France), I pursued a PhD in Photonics at ICFO in Barcelona, funded by a Marie Skłodowska-Curie fellowship. My doctoral research pioneered the use of planar plasmonic nanoantenna arrays combined with fluorescence correlation spectroscopy (FCS) and atomic force microscopy to visualize nanoscale membrane dynamics in living cells. Working within an FP7 network and an ERC Advanced Grant, I coordinated collaborative work packages and co-authored eight peer-reviewed publications (six as first author). My work earned the ICFO Thesis Award (2020) and the UPC Special Doctoral Award (2022), and included international collaborations and research stays with leading groups in France, Spain, and India.

From 2021 to 2024, as a postdoctoral researcher at EPFL, I expanded my experimental toolkit to label-free biophysical techniques. In collaboration with my colleagues, I showed that proteinogenic amino acids have the capacity to colloiddally stabilize weakly interacting nanoscale objects in solution and we proposed and validated a theoretical framework. Furthermore, I demonstrated how minimal concentrations of amino acids can modulate cross-interactions of protein isolates relevant for food science. I played a central role in a major Nestlé R&D project (~1 M CHF) and co-authored several high-impact publications, including a 2025 Nature paper (equal first author).

Since 2025, as a postdoctoral researcher at the University of Vienna, I apply my biophysical toolkit to quantify binding affinities of proteins linked to neurodegenerative diseases with specific post-translational modification generated by innovative semi-synthesis approaches of group members. In 2025, I received the highly competitive Ikerbasque Research Fellowship (14% success rate), which I will begin at CIC biomaGUNE in 2026.

Beyond research, I actively contribute to scientific leadership, mentoring, and community engagement. I have supervised or mentored more than 20 students and early-career researchers, supported career development at ICFO and EPFL, and served as Vice-President of the EPFL School Assembly. As the founder of the Policy Working Group of the EPFL Postdoc Association, I authored over ten position papers to improve working conditions and research assessment policies. I regularly present at international conferences (>20 talks), review for major journals (including JACS), and engage in outreach activities through lab tours, open days, and hands-on workshops.

Obtaining the prestigious Ramón y Cajal Fellowship would signify a huge leap forward on my career path towards becoming an independent PI and to pursue my passion for contributing at the forefront of scientific discovery not only in Spain, but on a global level.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: HOWARD VARONA, CRISTINA
Referencia: RYC2025-056940-I
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Título: Virocell biology and applications: Systems biology understanding of phage-host interactions and bacterial resistance to phages to engineer phage-based applications

Resumen de la Memoria:

La trayectoria científica de la Dra. Cristina Howard Varona se define por un enfoque multidisciplinar que integra biotecnología, biología molecular, microbiología, virología, ecología y biología de sistemas. Su investigación se centra en el estudio de las "virocélulas" (células reprogramadas por la infección viral) y cómo estas impactan la fisiología celular, las interacciones entre organismos y los ecosistemas; con el objetivo de informar modelos predictivos y desarrollar aplicaciones biotecnológicas.

Su carrera investigadora comenzó con una sólida formación internacional. Tras licenciarse en Biotecnología por la UPV (2011), realizó su doctorado en Biología Molecular y Celular en la Universidad de Arizona (2011-2015) con becas NSF y NIH. Durante esta etapa, estableció el sistema modelo marino Cellulophaga-fago y descubrió, mediante análisis genéticos y fisiológicos, la existencia de infecciones líticas ineficientes, desafiando paradigmas previos sobre los modos de infección viral.

En su etapa posdoctoral en Ohio State University (OSU, 2015-2020), lideró el desarrollo de un marco de "biología de sistemas de virocélulas". Utilizando multi-ómica resuelta temporalmente (transcriptómica, proteómica, metabolómica, lipidómica), demostró que fagos individuales generan virocélulas metabólicamente distintas en el mismo hospedador (Pseudoalteromonas). Además, extendió este marco para probar que las condiciones ambientales, como la limitación de nutrientes, pueden tener un impacto mayor que la genética viral en el metabolismo de la virocélula. Su trabajo también abarcó interacciones entre reinos, revelando cómo la depredación por protistas altera la energética de las cianovirocélulas.

Desde 2020, como Research Scientist en OSU, ha consolidado su independencia obteniendo financiación como investigadora principal (IP) del DOE y NSF, recaudando varios millones de dólares. Su investigación reciente ha ampliado el estudio a virocélulas de fagos de ssDNA y a mecanismos de resistencia. En un estudio reciente en Nature Microbiology (2025), combinó experimentación y modelado metabólico a escala genómica para descubrir cómo mutaciones espontáneas confieren resistencia intracelular mediante el recableado del metabolismo lipídico.

La Dra. Howard-Varona también ha navegado 4 bajas por maternidad (2018, 2021, 2022-23, 2025), durante las cuales ha mantenido liderazgo científico.

Su línea de investigación futura busca establecer un programa de biología de sistemas de virocélulas de referencia internacional. Este programa integrará mecanismos moleculares, multi-ómica avanzada (incluyendo translatómica y fluxómica) y modelado predictivo para: (1) comparar la fisiología de virocélulas de dsDNA vs. ssDNA; (2) dilucidar mecanismos de resistencia intracelular y sus compensaciones ecológicas; (3) mejorar los modelos ecosistémicos globales incorporando la actividad viral; y (4) desarrollar aplicaciones biotecnológicas como la fagoterapia, aprovechando su experiencia previa en la industria con E. coli patogénica.

Resumen del Currículum Vitae:

La Dra. Cristina Howard Varona es actualmente Research Scientist en el departamento de Microbiología en Ohio State University (OSU, EE. UU.), posición que ocupa desde 2020 tras una exitosa etapa posdoctoral en la misma institución (2015-2020) y un doctorado en la Universidad de Arizona (2015). Su carrera se caracteriza por una marcada internacionalización, con más de 13 años de experiencia en centros de excelencia de EE. UU. (NCSU, HHMI/UCSD, UofA, OSU).

Su producción científica incluye 19 publicaciones, de las cuales 13 son como primera o co-primer autora. Sus trabajos se han publicado en revistas de alto impacto como Nature Microbiology, Nature Reviews Microbiology (2 artículos), ISME Journal (6 artículos), Microbiome y mSystems. Su investigación ha tenido un alto impacto, acumulando más de 1.500 citas y un índice h de 14 (Google Scholar). Varios de sus artículos han recibido reconocimientos específicos, como el premio "Best Paper" (2020) y "Readers' Choice" (2018), ambos por la revista ISME Journal.

La Dra. Howard-Varona ha demostrado una sólida capacidad de liderazgo y captación de fondos, asegurando financiación competitiva como Investigadora Principal (IP) en proyectos multimillonarios del Departamento de Energía de EE. UU. (DOE) (ej. FICUS-61295, BERSS-507348) y como co-IP en proyectos del DOE y propuestas pendientes de la NSF. Además, posee experiencia en transferencia tecnológica gracias a su colaboración y estancia en la empresa biotecnológica Epibiome (ahora Locus Biosciences), donde lideró proyectos de fagoterapia.

En el ámbito de la formación, ha mentorizado a 49 investigadores (incluyendo 27 estudiantes universitarios, 16 de master or doctorado, 3 postdocs y 3 técnicos de laboratorio) y ha codirigido 18 tesis/proyectos de investigación. Su compromiso con la comunidad científica es notable: es revisora activa de muchas revistas (como Nature Microbiology e ISMEJ), co-desarrolladora del software de metabolómica MetaboDirect, y promotora de la ciencia abierta, haciendo públicos todos sus datos y protocolos bajo principios FAIR. Ha presentado su trabajo en 25 conferencias internacionales y ha impartido una charla TEDx sobre fagoterapia. Cabe destacar que ha mantenido su productividad y liderazgo científico a través de cuatro bajas por maternidad (2018, 2021, 2022-23, 2025), que no se registran formalmente (pero la documentación existe, si fuera necesaria) ya que la obtención del doctorado fue en 2015.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: KIM, IANA
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Título: Evolution of genome regulatory architecture in early animal lineages

Resumen de la Memoria:

My scientific trajectory is driven by a central question: how do genomes evolve new regulatory mechanisms, and how do transposable elements shape this process across evolution? I approach this question by integrating systems biology, multi-omics approaches and evolutionary genomics to uncover fundamental principles that connect genome structure, regulatory logic and phenotypic innovation.

During my PhD at the University of Bayreuth (Germany, summa cum laude), I pioneered the molecular characterization of the piRNA pathway in the planarian *Schmidtea mediterranea*. I resolved the global architecture of this pathway and demonstrated a previously unrecognized role of piRNAs in transcriptome surveillance in adult pluripotent stem cells. This work expanded the conceptual boundaries of small RNA biology and triggered my long-term interest in transposable element-host coevolution. Importantly, I also established the methodological foundation for planarian piRNA and transposable element research by developing a complete experimental toolkit for this emerging model.

As a postdoctoral researcher at the Centre for Genomic Regulation (Sebé-Pedrós and Martí-Renom labs), I developed a research trajectory centered on 3D genome biology and evolutionary genomics. I led a multi-institutional project that reconstructed the evolutionary origin of animal regulatory genome architecture across early-branching metazoans and their unicellular relatives. By combining Micro-C, ATAC-seq, ChIP-seq, single-cell and functional genomics, I demonstrated that regulatory chromatin loops, linking promoters with their distal cis-regulatory elements, are an ancestral feature of animal genomes. I further discovered lineage-specific architectural proteins associated with loop formation in ctenophores and showed that transposable elements contribute sequence motifs that shape lineage-specific 3D genome folding. This work revealed that the emergence of animal regulatory complexity was tightly intertwined with innovations in 3D chromatin organization.

The unifying theme of my research is the search for evolutionarily conserved principles that govern genome regulation. My future line builds directly on this foundation by using compact vertebrate genomes, particularly pufferfishes, as a natural experiment to dissect how genome size, transposable element content, and chromatin architecture constrain and enable regulatory innovation. Genome compaction in pufferfishes offers a unique opportunity to identify the essential components of enhancer grammar, determine how regulatory interactions scale with non-coding DNA, and reveal how transposable elements are integrated into vertebrate regulatory networks. By integrating comparative genomics, single-cell multi-omics and functional assays, my work will define how cis-regulatory code evolves under diverse evolutionary constraints. Together, these lines of work provide a solid foundation for an independent research program with the potential to transform our understanding of genome evolution and regulatory complexity.

Resumen del Currículum Vitae:

I am a molecular biologist with extensive expertise in systems biology, comparative genomics and evolutionary biology. I completed my PhD at the University of Bayreuth (Germany) with summa cum laude, the highest academic distinction (top 10% nationally; ~2% in Bavaria). My doctoral research established the molecular architecture of the piRNA pathway in the planarian *Schmidtea mediterranea* and revealed a previously unknown role for piRNAs in transcriptome surveillance in adult stem cells (Genes Dev. 2019, first author), work that received the Student Award at the 2018 International Planarian Meeting (USA). To achieve these results, I independently developed a methodological toolkit for *S. mediterranea*, including immunoprecipitation protocol for all PIWI proteins (Methods Mol Biol 2023a, 2023b), a novel rRNA depletion strategy (BMC Genomics 2019) and optimized multiple omics approaches. During this period, I supervised three Master's theses (20 month total) and designed and taught graduate-level courses in molecular biology and bioinformatics (54 teaching hours).

As a Juan de la Cierva-Incorporación fellow at the Centre for Genomic Regulation (Barcelona), I broadened my research to the evolution of genome regulation. I led the conceptual design, coordination and execution of my project reconstructing genome regulatory architecture across all five animal lineages and their unicellular relatives (Nature 2025, first and co-corresponding author). This study uncovered conserved principles of animal genome organization and identified molecular mechanisms of chromatin looping in ctenophores. In parallel, through the Catalan Initiative for the Earth BioGenome Project and international collaborations, I generated chromosome-level genome assemblies for 6 species (Nature 2025a, Nature 2025b, Sci Adv 2024) and produced chromosome-level assemblies for 4 additional species using publicly available genome sequences. These resources now support comparative genomics and evolutionary studies across diverse lineages.

To date, my work has resulted in 12 peer-reviewed publications (8 research articles, 2 book chapters, 1 review and a white paper) and one patent. I am first author on 6 publications and co-corresponding author on 2 (Kim IV, et al. BMC Genomics 2019; Kim IV, et al. Nature 2025), demonstrating my ability to lead, design and coordinate multidisciplinary research. I have presented my work at 12 conferences (8 selected talks, 4 posters), delivered 5 invited lectures, co-organized an international symposium, and established an international collaborative network across Europe, Asia and the USA. Together, these achievements demonstrate my independence, leadership, and readiness to establish an internationally competitive research program.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: MUÑOZ CASTAÑEDA, RODRIGO
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Título: BRAINSPAN. A Multimodal Cellular-Resolution Framework to Predict Brain Aging
Resumen de la Memoria:

My scientific trajectory focuses on understanding how the cellular and functional architecture of the brain supports behavior and how these relationships change during aging. I trained in molecular and behavioral neuroscience during my PhD at the University of Salamanca, where I investigated cerebellar degeneration and neuroprotective mechanisms. Following my doctoral work, I transitioned to quantitative neuroanatomy and computational analysis at Cold Spring Harbor Laboratory. There, I developed methods for whole brain registration, 3D segmentation and automated cell quantification that were incorporated into large scale efforts of the BRAIN Initiative Cell Census Network. My contributions supported the construction of multimodal cell type atlases, large scale circuit analyses and high performance visualization frameworks that are now widely used in the community.

I subsequently served as Director of Drug Development at Certego Therapeutics, coordinating an interdisciplinary team applying whole brain functional imaging and machine learning to characterize neural activity patterns induced by pharmacological compounds. This role strengthened my ability to lead complex experimental and computational workflows, manage data intensive pipelines and supervise multidisciplinary teams. Since 2023, I have continued my research at Weill Cornell Medicine, where I develop methods that integrate cell type markers, task evoked neuronal activity and predictive modeling to study aging related vulnerability in memory circuits.

My independent research line centers on the multimodal integration of brain wide structural and functional data to explain cell type specific vulnerability, network level reorganization and the mechanisms underlying cognitive decline. This conceptual direction extends beyond previous anatomical atlases or isolated activity mapping, establishing a framework that combines whole brain imaging, automated quantification, spatial statistics and predictive modeling to distinguish healthy from impaired aging.

The BRAINSPAN program formalizes this agenda by generating a multimodal atlas that integrates cell type distributions, task evoked activity maps and models predicting cognitive performance. The project leverages advanced infrastructure, including light sheet microscopy, tissue clearing and immunolabeling platforms, behavioral testing facilities and high performance computing resources. This environment enables the systematic and quantitative characterization of aging related changes and will produce open access resources and reproducible analytical tools for the neuroscience community.

My long term goal is to establish an independent research program in Spain focused on computational neuroanatomy, multichannel imaging and predictive models of brain aging. This agenda will support competitive national and international grant applications, foster interdisciplinary collaborations and contribute to the development of a Multimodal Brain Mapping framework within the host institution.

Resumen del Currículum Vitae:

I am a neuroscientist with extensive international experience in whole brain imaging, computational neuroanatomy and multimodal analysis. My career integrates experimental and computational approaches to understand how cellular architecture and brain wide activity support behavior and how these processes are altered during aging. I completed my PhD at the University of Salamanca, where I investigated molecular and cellular mechanisms of cerebellar degeneration and gained expertise in quantitative histology and behavioral neuroscience.

In 2016, I joined Cold Spring Harbor Laboratory, where I established myself as a key contributor to large scale neuroanatomy and computational pipelines. I developed methods for whole brain registration, 3D cell detection and multimodal data integration that were adopted across the BRAIN Initiative Cell Census Network. These contributions provided conceptual and technical foundations for several high visibility atlases and circuit level studies, illustrating my capacity to generate tools that shape collaborative research efforts. I also coordinated imaging workflows and managed data infrastructures, strengthening my leadership in large scale, team driven projects.

From 2022 to 2023, I served as Director of Drug Development at Certego Therapeutics, where I led a multidisciplinary team applying whole brain activity mapping and machine learning to characterize pharmacological signatures in models of neuropsychiatric disorders. This position expanded my leadership in project design, strategic planning and computational development, and it demonstrated my ability to guide interdisciplinary teams in translational settings.

Since 2023, as a Research Associate at Weill Cornell Medicine, I have advanced an independent research line that integrates cell type distributions, immediate early gene activity and predictive modeling to study aging related vulnerability in memory circuits. I have developed analytical frameworks that combine whole brain imaging, spatial statistics and predictive models, establishing a direction that extends beyond prior anatomical and functional mapping approaches.

I have authored publications in leading journals, contributed to multi institutional consortia and developed open access datasets and software used widely in the neuroscience community. I have supervised students, technicians and PhD trainees, supporting their development in imaging, computational analysis and scientific communication. My research is marked by methodological innovation, sustained leadership across experimental and computational domains and a strong commitment to open science.

My long term objective is to establish an independent research program in Spain focused on multimodal neuroanatomy and predictive models of brain aging. My trajectory demonstrates the capacity to lead original research directions, develop advanced analytical tools and build collaborative environments that enhance the national and international visibility of the host institution.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
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Título: Beyond mechanosignaling: Piezo1 activation by soluble cues in health and disease
Resumen de la Memoria:

I study how cells sense physical forces through ion channels and how this controls cell functions in health and disease.

As BSc/MSc student at UPF, I trained in ion channel biophysics under Profs. M.A. Valverde and R. Latorre, mastering patch clamp and Ca^{2+} imaging. I discovered molecular requirements for TRPV4 activation by heat.

As PhD student at UPF, I established collaborations to combine microfluidics, traction force microscopy and live imaging to discover Piezo1 enables confined migration and Piezo2 senses matrix rigidity, both essential for metastasis. This established Piezo channels as key cancer mechanotransducers. I appeared in Spanish media and won the Extraordinary PhD Prize.

As postdoc Fellow with competitive fellowships (HFSP, MSCA), I gained PI independence in J. Rosenblatt's group. I discovered new roles for ion channels in extrusion (Nature 2021, 2025) and clathrin-mediated endocytosis (CME) mechanoadaptation (Nature 2021, 2025; Sci. Adv. 2023, submitted 2025). I built international network with MIT, Sorbonne, Helsinki, Cambridge. My leadership was recognized by corresponding authorships, the 2023 BSCB Medal, and in media.

Proposal: Piezo channels framed as master mechanoregulators since 2010. I propose studying a completely overlooked aspect: Piezo activation by soluble signals like lysophosphatidic acid (LPA). My preliminary data shows Piezo1 is essential for LPA responses: Ca^{2+} entry, focal adhesions and stress fiber growth, YAP nuclear accumulation. This suggests soluble and mechanical signals converge on Piezo1 to activate RhoA-YAP controlling cell fate. I envision 3 lines:

1. Mechanochemical balance of mitosis/migration: Migration and division are mutually exclusive but spatially linked as migrating cells stop before dividing along their migratory axis. Then, daughter cells resume migration in opposite directions along the same migratory axis. How is spatial information transmitted? Focal adhesions disassemble at mitosis, but reticular adhesions persist. Both and Piezo1 are essential for mitosis, and we found Piezo1 balances these adhesions. I hypothesize Piezo1 transmits spatial information via reticular adhesions through phosphorylation-dependent remodeling. Using live imaging of CRISPR-edited Piezo1 mutants with photoconvertible labels, micropatterning and microfluidics, I will track molecules between generations.

2. Piezo1 activation by soluble cues: RhoA responds to LPA and mechanical cues. How they converge remains unknown. My data shows Piezo1 is essential for LPA-induced RhoA activation and that LPA transactivates Piezo1 via LPA Receptors and Src. I will combine Ca^{2+} imaging, patch clamp, mass spectrometry and mutagenesis to determine if activation is mechanical (Src-contraction) or biochemical (phosphorylation).

3. Piezo1 in PDAC metastasis: Pancreatic adenocarcinoma (PDAC) is metastatic with poor prognosis. LPA promotes invasion via CME. How PDAC adapts endocytosis/migration to stiff, confining stroma is unknown. I found Piezo1 senses both confinement and stiffness. I hypothesize Piezo1 enables LPA signaling/endocytosis under confinement, sustaining metastasis. Using microfluidics and in vivo models (L. Machesky, Cambridge), I will identify and validate mechanisms.

Impact: will redefine Piezo beyond mechanosensing, identify druggable targets and establish me in Spain's public research system.

Resumen del Currículum Vitae:

I am a cell biologist specializing in mechanotransduction, ion channel biophysics and epithelial cell dynamics, focusing on how cells sense physical forces with implications for tissue homeostasis, cancer and fibrosis.

BSc/MSc, Universitat Pompeu Fabra (UPF, Barcelona). Areas: Ion channel biophysics, patch clamp, calcium; imaging, thermosensation. Training under Profs. M.A. Valverde (UPF) and R. Latorre (U. Valparaíso, Chile). Output: Paper on TRPV4 activation by heat (García-Elias et al., PNAS, 2013, 165 cit.). Dissemination: 2 international posters. Awards: Undergraduate research grant, First Class Honors.

PhD (UPF). Areas: Piezo channels, cancer mechanobiology, metastasis, microfluidics, traction force microscopy. Pioneered Piezo channels as metastasis drivers. Collaborations with K. Konstantopoulos (Johns Hopkins) discovering Piezo1 enables confined migration (Hung et al., Cell Reports, 2016, cover, 193 cit.), and X. Trepat (IBEC) identifying Piezo2 in mechanoresponses (Pardo-Pastor et al., PNAS, 2018, 258 cit.). Dissemination: Spanish media (La Vanguardia, El País, RNE), invited SEBBM speaker, 8 conference presentations. Awards: Extraordinary PhD Prize, Cum Laude, FPI Fellowship (100k€), short-stay grants (25k€), Institut Curie Course (<30% acceptance).

Postdoc: U. Utah, King's College London, The Crick (USA/UK). Areas: Epithelial cell extrusion, ion channels, clathrin-mediated endocytosis, EGFR signaling, adhesion dynamics. Secured HFSP and MSCA fellowships (~400k€), achieving PI independence and promotion to Fellow. First identification of extrusion determinants: replication stress and ATP deficiency (Dwivedi et al., Nature, 2021; Mitchell et al., Nature, 2025). Discovered Piezo1 triggers clathrin-mediated endocytosis and ligand-induced signaling (Pardo-Pastor & Rosenblatt, Sci. Adv., 2023, 21 cit.; submitted manuscript on adhesion balance both as corresponding author). Supervised 2 PhD, 4 MSc, 3 BSc students. Built network with Sorbonne, U. Helsinki, U. Cambridge, MIT. Output:



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Turno General

2 first/corresponding-author, 5 co-authored papers, 3 reviews. Dissemination: 28 presentations (15 posters, 6 selected, 7 invited talks), Spanish media, outreach. Awards: 2023 BSCB Postdoctoral Medal.

Teaching/Supervision: >300h undergraduate teaching (UPF, KCL, 2013-2025). Supervised 2 PhD, 4 MSc, 3 BSc students. Co-organized RECI V. Reviewer: JCB, Nat. Comms., Gut, PLoS; Guest Editor Front. Cell Dev. Bio.; ERC and BBSRC reviewer; EU Expert Database; 3 PhD examiner.

Career in numbers: 17 open-access publications (h-index 12, >1150 cit.), >400k competitive funding.



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Turno General

Área Temática: Biociencias y biotecnología
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Título: Remodelling of reproductive and metabolic hypothalamus

Resumen de la Memoria:

I am an expert in neuroendocrinology of reproduction and metabolism. Originally from Madrid, I graduated from Universidad Autónoma de Madrid and did one-year Erasmus at the University of Manchester, specializing in neurosciences. My initial training, as a Joint PhD student in France and UK was in chronobiology of seasonal rhythms and maternal programming. I specialized in neural pathways involved in the metabolic control of reproduction, at University of Michigan (UM). My interest is the development and plasticity of the hypothalamic circuits associated with metabolism and reproduction. I have expertise in comparative neuroendocrinology, physiology, chemogenetics and viral vectors, transgenic mice, transcriptomics and bioinformatics. I did a Joint PhD between the University of Strasbourg (France) and the University of Aberdeen (UK) 2010-2014 with Postgraduate Funding from Mutua Madrileña and Région Alsace. Here I demonstrated the neuroendocrine correlates of endogenous circannual rhythms in long-day (sheep) and short-day (hamster) breeders. I next showed that maternal photoperiodic programming, the transmission of the seasonal information from the mother to the fetus in utero via melatonin, affects the long-term physiology of offspring. We defined the neuronal pathway engaged in the hypothalamus and the long-term changes that this prenatal history exerts in tanycytes, special glial cells of the hypothalamus, reflected by changing local levels of thyroid hormone metabolism. In my postdocs and later trajectory at the UM 2016-2025, I described novel neural pathways integrating the metabolic control of reproduction. My work demonstrated, against prior knowledge, that glutamate neurotransmission is necessary for pubertal development using specific deletion of glutamate transporter in leptin sensitive neurons. We also discovered a new neuronal population of dopamine transporter expressing neurons involved in this function, with a potential critical role in puberty, using projection targeting with stereotaxic injections of viral vectors, hormone and diet manipulations. Now, as Research Assistant Professor since September 2025, I am developing my independent lines of research, leveraging my systems neuroscience, neuroendocrinology and mouse genetics expertise to gain deeper understanding of the development and plasticity of the hypothalamic circuits associated with metabolism and reproduction during key developmental windows with an emphasis on the effects of light and nutrition. On one project, I will explore the effects of maternal exposure to changing duration of light per day (i.e. photoperiod) during pregnancy in the prenatal structural changes and formation of metabolic pathways in the hypothalamus. For this research, I have obtained pilot funding as PI (UM Nutrition and Obesity Research center) and as Co-investigator (NIH). In a second project, I will investigate how pregnancy remodels the metabolic hypothalamus. This project will explore the hypothalamic mechanisms elicited by normal metabolic adaptations to pregnancy and the impact of obesity in these adaptations. I have 4 pending major applications for funding (2 NIH, Burroughs-Wellcome Fund and Fundación Ramón Areces).

Resumen del Currículum Vitae:

I graduated from Universidad Autónoma de Madrid in 2010, with Matrícula de Honor and special mention. In 2009-10 I did an Erasmus year at the University of Manchester, where I performed my final degree project. I then did a Joint PhD between the University of Strasbourg, France and the University of Aberdeen, UK (2010-14), which was evaluated with "No corrections" from the British system. From this PhD, I produced 7 articles, with 5 as first author, and 2 as corresponding. I have presented this work at more than 10 national and international conferences and been invited as speaker at 2 international conferences. I have written 2 reviews as expert in this topic, one as sole author, and one in collaboration with international experts different than my supervisors. I have co-organized 2 early-stage researcher symposiums for international congresses. In 2015, I obtained the Young Investigator award from the French Society of Neuroendocrinology. I then moved for a postdoc to the University of Michigan (UM) department of Molecular, Cellular and Developmental Biology (2016-18). From this stage, I produced 2 papers with one as first author. I presented this work at an international conference. Here, I participated in training for active and inclusive teaching and for general science communication. I mentored an undergraduate student who obtained a prize for his poster with our work. I obtained an undergraduate training grant for him (2017). He is second author in one of my papers. In 2018-2021 I was postdoc at the UM Molecular and Integrative Physiology department. In August 2021 I had a maternity break. Then I continue to a Research Investigator in the same lab (2021-2025). Here, I have produced 6 articles (3 as first author and one as corresponding), and I have 1 review with international collaborators in revision. I have presented this work at more than 10 national and international conferences. In 2024, I received the Research Investigator Prize from the Physiology Department. At UM, I have received training in Leadership and Management, Engaged Mentoring, and single cell and RNA sequencing analysis. I mentored 5 undergraduate and high school students, I co-mentored a Medical Fellow student in her fellowship research stage and I am co-mentoring a Senior student during her Honor Thesis. I have taught in lectures and practical courses. In 2022, I participated as an expert in discussion panel of the US Departments of Agriculture and of Energy. I have been elected member of a "Research Climate Council" at UM, aiming at identifying and proposing solutions for problems for University personnel (2022-24). Since 2024, I am a member of the Panamerican Neuroendocrine Society communications committee. I have obtained independent pilot funding as Principal Investigator from Michigan Nutrition and Obesity center (2021), and as co-Investigator for a 2-year R21 grant from NIH (2022), which I entirely developed. Through my career, I have peer reviewed more than 20 articles, including for Current Biology and PNAS and I am review editor at 2 Frontiers journals. I have acted as abstract evaluator and poster judge for meetings of the Michigan Alliance for Reproductive Technologies and Science conference (2022-2025). I have been invited by leading experts to speak at 5 international universities, including Harvard, U. Sao Paulo and U. Lille.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
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Título: Developmental Plasticity in vivo and in vitro

Resumen de la Memoria:

Embryonic development is not solely determined by genetics. Developing embryos require and respond to environmental information, making development inherently plastic. My research investigates "morphogenetic plasticity": how developing systems produce varied shapes from identical genetic material based on environmental signals.

Developmental plasticity in vivo: Using advanced microscopy, computational analysis, and mathematical modelling, I manipulated biochemical signals from extraembryonic tissues (support tissues that don't contribute to the final animal) revealing that early embryos could be reprogrammed to acquire radically different geometries (linear, triangular, annular, or circular forms) depending on the distribution of molecular motors (proteins enabling cell movement and rearrangement).

Developmental plasticity in vitro: To overcome limitations of studying embryos (where environment is controlled by maternal cues, extraembryonic signals, and geometric constraints of the egg or uterus), I used gastruloids: 3D stem-cell aggregates that mimic embryonic body axis formation that grow in a fully controllable in-vitro environment. Normally, these floating spheres elongate by cells taking traction from each other. However, if they are given a source of traction (an adherent substrate), these gastruloids flatten into 2D disks, but still generated patterned body axes. Critically, in this situation, cells employed a fundamentally different morphogenetic mechanism than they use in 3D, demonstrating that cells can access alternative developmental toolkits to generate a body axis depending on physical context.

Altogether, my research shows that embryos possess latent morphogenetic capabilities. My avian work shows how identical embryos can produce multiple morphologies depending on environment, while my gastruloid work reveals that similar developmental outcomes can be achieved through alternative mechanisms.

Now my research will systematically determine which aspects of mammalian body axis formation are genetically programmed versus environmentally plastic, using gastruloids. These systems maintain consistent internal developmental programs while exhibiting different morphological outcomes depending on environmental parameters, making them ideal for separating intrinsic constraints from environmental influences. Building on my discovery that gastruloids display plasticity in both axis number and elongation mode, I will address two fundamental morphogenetic questions: how is axis number controlled, and how do cells select force-generation strategies for elongation. By learning what remains invariant between plastic modes I will learn the internal constraints of the embryo, while environmentally plastic features will provide new opportunities for manipulation.

Through collaboration with mathematical modelers, this work will establish quantitative principles of morphogenetic plasticity with applications to understanding evolutionary innovation and rationally engineering tissues and organoids with desired architectures.

This research will advance tissue engineering for disease modelling and regenerative medicine, enable the prediction of developmental responses to perturbations and clarify evolution's capacity for innovation (e.g. genes as followers hypothesis).

Resumen del Currículum Vitae:

Research Focus

I am a quantitative cell and developmental biologist investigating how developing tissues achieve morphogenetic plasticity by integrating genetic programs with environmental constraints. My interdisciplinary approach combines stem cell models, quantitative imaging, mathematical modelling, and computational analysis to reveal cellular mechanisms underlying shape control and establish predictive frameworks for programming tissue architecture.

Career Trajectory

I hold a Leverhulme Trust Early Career Research Fellowship (2023-2026) at the University of Cambridge (Steventon lab), where I also serve as a Research Fellow on the Hughes Hall Governing Body. Previously, I completed my PhD at the University of Dundee (2016-2021, Weijer lab) studying cell and tissue dynamics driving gastrulation, for which I received the Beddington Medal 2022 (BSDB) for best thesis. During my PhD, I also contributed to AI-driven drug discovery at ExScientia Ltd. My training includes MSc degrees in Computational Systems Biology (Newcastle University) and Biophysics (Universidad Autónoma de Madrid), both with first-class honours.

Research Achievements

My research has demonstrated that embryos possess latent morphogenetic capabilities accessible under different environmental conditions. In chick embryos, I revealed how manipulating biochemical signals from extraembryonic tissues induces alternative gastrulation modes depending on molecular motor distributions. I subsequently decoupled embryo size from shape, showing these represent independently controllable parameters. In gastruloids (stem cell-based models of body axis formation), I discovered that cells employ fundamentally different morphogenetic mechanisms to achieve axis elongation depending on physical context: collective movements in 3D versus surface migration on 2D substrates.

Technical Expertise



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Turno General

I have developed extensive capabilities spanning experimental biology and computational methods. Experimentally, I work with advanced microscopy (light-sheet, confocal, high-throughput imaging), gastruloid and stem cell culture and chick embryos. Computationally, I specialize in image analysis (cell tracking, segmentation, PIV, strain rate analysis), big data management (TB-scale datasets), machine learning, deep learning, and natural language processing. I collaborate extensively with mathematical modelers to develop predictive frameworks for morphogenetic control.

Leadership and Service

As a Research Fellow, I serve on the Hughes Hall Governing Body and Council, participating in institutional governance including budget oversight and policy decisions. I supervise a research assistant and have mentored seven undergraduate research projects. I teach undergraduate cell biology through Cambridge's supervision system and review for research journals.

Vision

I am seeking to establish an independent research group to transform insights about morphogenetic plasticity into predictive frameworks for rational organoid engineering while training the next generation of interdisciplinary biologists.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: DOMINGO MUELAS, ANA
Referencia: RYC2025-055231-I
Correo Electrónico: anadomingomuelas@gmail.com
Título: Live-imaging preimplantation development

Resumen de la Memoria:

Over the past 10 years I have developed extensive expertise in the fields of adult stem cells and early embryonic development, contributing to 15 peer-reviewed publications including five first author publications in leading journals including Cell, Nature Communications and Science. During my doctoral studies in the team of Dr. Isabel Fariñas at the Universitat de València, initially with a FPU fellowship and later as a CIBERNED researcher (2013-2021), I focused on investigating the molecular regulation of adult neural stem cells (NSC) in their homeostatic microenvironment. My work contributed to the field by identifying novel molecular mechanisms that maintain stemness and intrinsic regulators that coordinate the transition between quiescent and actively proliferating cell states (Nature Comms 2023, 14(1):373; Cell and Molecular Life Sciences 2023, 80(1):36). I also collaborated with national and international research groups to understand the role of epigenetic mechanisms (Nature Comms 2024, 15(1):2837; Nature Comms 2015, 6, pp.8265), cell cycle regulators (iScience 2023, 26(3):106202; Scientific Reports 2017, 7(1):9580; Stem Cells 2017, 35(12):2403-2416) and paracrine signaling (Cell Stem Cell 2021, 28(2):285-299.e9) on NSC behavior and differentiation. As part of these collaborations, I was a visiting researcher in Dr. Robin Lovell-Badge's lab at The Francis Crick Institute in London (UK). My doctoral work at the Fariñas lab was recognized with the Young Investigator Award 2024 from CIBERNED. After acquiring a strong molecular background in stem cell biology during my PhD, I was motivated to expand my training in microscopy. I joined Dr. Nicolas Plachta's lab at the University of Pennsylvania in Philadelphia (USA) (2021-present) as a postdoc to apply live-imaging techniques to answer fundamental cell biology questions using the preimplantation embryo as an in vivo system. I pioneered the use of non-invasive fluorescent dyes to perform 4D live-imaging of human preimplantation embryonic development at high temporal and spatial resolution (Cell 2023, 186(15):3166-3181.e18; Sciences Advances, 11(47):eady6402). A key finding was the identification of nuclear budding and DNA shedding into the cytoplasm, which was exacerbated by trophectoderm biopsy, a mechanical procedure routinely performed for genetic testing in fertility clinics. During my postdoctoral stay, I lead collaborations with fertility clinics and industry, and I also participated in projects that evaluated cell fate determination (Nature Comms 2023, 14(1):3101) and mitotic fidelity (Science 2025, 388(6749):eads1234) in the early mammalian embryo. My postdoctoral work at the Plachta lab was recognized with the Holtzer Prize 2023 from the University of Pennsylvania. Finally, our human embryo images were depicted in National Geographic (01.2024 issue, Illuminating the Human Embryo) and led to the compilation of an Atlas of Human Embryo Development book (CRC Press 2025, ISBN 9781032751474). For my future independent career, I want to use this vast experience in imaging and molecular biology to explore fertilization and cell division modes in early development.

Resumen del Currículum Vitae:

I graduated in BSc in Biochemistry and Biomedical Sciences (2013) and MSc in Research in Molecular, Cellular and Genetics Biology with MSc extraordinary award (2014) (Universitat de València). I obtained my PhD in Biomedicine and Biotechnology from the Universitat de València in 2019 and later joined the University of Pennsylvania (USA) as a postdoctoral researcher in 2021. Over the past 10 years as a researcher, I have developed extensive expertise in the fields of adult stem cells and early embryonic development. I contributed to 15 peer-reviewed publications including five first author publications in leading journals including Cell, Nature Communications and Science. During my doctoral studies in the team of Dr. Isabel Fariñas at the Universitat de València, initially with a FPU fellowship and later as a CIBERNED researcher (2013-2021), I focused on investigating the molecular regulation of adult neural stem cells (NSC) in their homeostatic microenvironment. My work contributed to the field by identifying novel molecular mechanisms that maintain stemness and intrinsic regulators that coordinate the transition between quiescent and actively proliferating cell states (Nature Comms 2023, 14(1):373; Cell and Molecular Life Sciences 2023, 80(1):36). As part of my training, I was a visiting researcher in Dr. Robin Lovell-Badge's lab at The Francis Crick Institute in London (UK) (2017). My doctoral work at the Fariñas lab was recognized with the Young Investigator Award 2024 from CIBERNED. For my postdoctoral training, I joined Dr. Nicolas Plachta's lab at the Perelman School of Medicine (University of Pennsylvania) in Philadelphia (USA) (2021-present). I pioneered the use of non-invasive fluorescent dyes to perform 4D live-imaging of human preimplantation embryonic development at high temporal and spatial resolution (Cell 2023, 186(15):3166-3181.e18; Sciences Advances, 11(47):eady6402). During my postdoctoral stay, I also participated in projects that evaluated cell fate determination (Nature Comms 2023, 14(1):3101) and mitotic fidelity (Science 2025, 388(6749):eads1234) in the early mammalian embryo. My postdoctoral work at the Plachta lab was recognized with the Holtzer Prize 2023 from the University of Pennsylvania. Finally, our human embryo images were depicted in National Geographic (01.2024 issue, Illuminating the Human Embryo) and led to the compilation of an Atlas of Human Embryo Development book (CRC Press 2025, ISBN 9781032751474).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: SABARÍS DI LORENZO, GONZALO JULIÁN
Referencia: RYC2025-056838-I
Correo Electrónico: gsabaris@gmail.com
Título: Mechanisms of epigenetic inheritance in natural populations

Resumen de la Memoria:

I am a molecular geneticist investigating the molecular basis of phenotypic variation and evolution. My research integrates gene regulation, 3D chromatin organization, and epigenetic inheritance to understand how regulatory mechanisms shape development and adaptation. Throughout my career, I have contributed to the understanding of multiple levels of biological organization. During my PhD, I focused on DNA regulatory sequences and their roles in controlling gene expression. I demonstrated that transcriptional enhancers function across multiple developmental contexts, showing that they are far more pleiotropic and evolutionarily constrained than previously appreciated. This work provided new insights into the architecture, flexibility, and evolutionary dynamics of cis-regulatory elements. During my postdoctoral training, I investigated the molecular bases of Waddington's genetic assimilation by integrating experimental evolution with genomic and epigenomic analyses to probe the sources of heritable phenotypic variation. We found that standing genetic variation, rather than stress-induced mutations or inherited epialleles, is the primary substrate for selection during genetic assimilation. In parallel, I examined the contribution of chromatin topology to gene regulatory processes and to the emergence of stable epigenetic inheritance. I am currently a Marie Skłodowska-Curie Postdoctoral Fellow, developing an independent research program that integrates piRNA biology, paramutation, and chromatin organization to dissect epigenetic inheritance in natural *Drosophila* populations. My work investigates how natural genetic variation can lead to stable changes in the epigenetic state of piRNA-producing alleles that persist across generations. This research uses state-of-the-art epigenomic assays, as well as population genomics, to study wild-caught flies and determine the mechanisms and evolutionary significance of transgenerational epigenetic inheritance in nature.

Resumen del Currículum Vitae:

My home country is Argentina, where I completed all my academic training. I earned a professional degree in Hemotherapy and Immunohematology from the Faculty of Medicine, University of Buenos Aires (UBA), in 2004. I subsequently worked for more than eight years as a Clinical Laboratory Technician at the public regional reference hospital "Héroes de Malvinas" in Buenos Aires. In parallel, I pursued studies in Biology and obtained my Bachelor's and Master's degrees from the Faculty of Science, UBA, in 2013. My Master's work was recognized with the Best MSc Thesis Award in Biotechnology (2014). I was then awarded a competitive 5-year doctoral fellowship from the Argentinian national science agency (CONICET) to carry out my PhD under the supervision of Dr. Nicolás Frankel at UBA, where I graduated in March 2018. During this period, I also held a part-time Assistant Professor position at UBA, obtained through competitive calls, and taught undergraduate and graduate courses including Molecular and Cellular Biology, Molecular Bioinformatics, Biological Chemistry, and Developmental Genetics. After completing my PhD, I received a competitive 2-year CONICET postdoctoral fellowship, which allowed me to remain one year as a postdoctoral researcher in the Frankel laboratory. I resigned this fellowship in 2019 to relocate to France to join the laboratory of Dr. Giacomo Cavalli at the IGH-CNRS for my postdoctoral research, where I worked for more than five years and built a strong publication record. To date, I have authored numerous high-impact publications and maintained a high level of productivity throughout my MSc, PhD, and postdoctoral stages. I bring extensive expertise in quantitative imaging and multi-omics approaches, including RNA-seq, small RNA-seq, CUT&RUN, ATAC-seq, Hi-C, and Micro-C, applied across *Drosophila*, mammalian cells, and clinical samples. I also have strong proficiency in NGS data analysis spanning chromatin biology, transcriptomics, and 3D genomics. I am currently a Marie Skłodowska-Curie Actions Postdoctoral Fellow in the laboratory of Josefa González at the Institut Botànic de Barcelona (CSIC). I have mentored two Master's students and trained six PhD students, including co-supervision of Daniela Ortíz (2016, UBA) and Rossella Damiano (2025, Universitat Autònoma de Barcelona), both of whom received the highest distinction. Throughout my career, I have contributed to international collaborations, secured competitive funding, and presented my work at major conferences. I have experience mentoring, collaborating across multidisciplinary teams, and conducting both wet-lab and computational research. My long-term objective is to establish an independent research group focused on integrating epigenomics, genome evolution, and chromatin architecture.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: CANAL DE TORRES, BERTA
Referencia: RYC2025-055308-I
Correo Electrónico: bertacanal@gmail.com
Título: Reconstitution of chromosome replication and protection

Resumen de la Memoria:

My research career focuses on studying the impact that fundamental aspects of DNA replication have on genome instability, immune responses and cancer development. During my PhD work at the laboratory of Francesc Posas and Laia de Nadal at MELIS-University Pompeu Fabra in Barcelona (2013-2018), I uncovered a global mechanism that prevents genome instability from a wide variety of stress- and mutation- stimulated transcriptional outbursts during S phase. These findings led to two first-author publications a research article in Nature Communications (2018) and an author's views at Molecular and Cellular Oncology (2018), and provided a framework for new research in the lab that is exploring how this mechanism impacts telomeric DNA replication in situations of stress. For this project I secured two PhD fellowships and received conference awards and the Doctoral-School PhD Extraordinary Award.

During my Postdoc in the laboratory of John Diffley at the Francis Crick Institute in London (2019-2026), I integrated my cell and molecular biology background with the lab's transformative biochemical reconstitution of DNA replication with purified proteins, and led two main research projects resulting in two first-author publications in Molecular Cell (2025). Our findings represent a significant breakthrough in the field of DNA replication and genome instability, and provides a satisfying explanation of the mechanism why DNA replication collapses and how the DNA replication checkpoint prevents it. For these projects, I secured an EU Horizon 2020 Marie Skłodowska-Curie Postdoctoral Fellowship, bringing external funding to the host laboratory. I also secured additional funding to support my salary and research from the Francis Crick Institute (2023-2026) to generate preliminary data for my future group.

I led a multidisciplinary collaboration with leading international groups during the COVID19 pandemic to screen for viral genome replication inhibitors that resulted in 7 publications at the Biomedical Journal (2021), two as first author. Other international collaborations I secured include a publication in Cell (2023) and a manuscript currently under review in Nature. I have contributed to a Wellcome Trust senior investigator, and ERC advance and an ERC synergy project involving collaborations with international groups across Europe. I have mentored and supervised master, PhD and postdoc projects.

My future research aims to define the molecular mechanisms that protect stalled DNA replication forks, how these protective mechanisms fail, and how replication errors interface with genomic instability, innate immune activation and cancer development. Building on my postdoc findings, I will now exploit the biochemical reconstitution of human DNA replication and combine it with cell biology and genetics. My aims are to gain deeper understanding on the mechanism of DNA replication collapse in human cells, study how replication-derived DNA structures regulate nuclear and cytoplasmic immune pathways including cGAS/STING, and explore how certain stem and immune cells (e.g., activated B cells) drastically shorten S phase without incurring DNA replication collapse.

Resumen del Currículum Vitae:

I am a postdoctoral researcher at the Francis Crick Institute (London) specializing in DNA replication, genome stability, and biochemical reconstitution of replication mechanisms. My trajectory combines cell biology, genetics, and state-of-the-art biochemistry to uncover how cells preserve genome integrity during DNA replication. I have produced high-impact publications, led competitive projects, and built a strong path toward scientific independence.

After completing my Biology degree at the University of Barcelona, I received several competitive fellowships that allowed me to gain research experience locally and abroad. I conducted my MSc and PhD in the laboratories of Francesc Posas and Laia de Nadal (University Pompeu Fabra), funded by FI and FPI fellowships. My PhD work, awarded the Doctoral-School PhD Extraordinary Award, uncovered a mechanism that integrates stress signaling with DNA replication to prevent genome instability. My PhD research led to two Nature Communications papers, multiple talks, outreach activities, and seeded a new research line in the host lab.

Since 2019, I have worked in John Diffley's laboratory at the Francis Crick Institute, a leader in the biochemical reconstitution of eukaryotic DNA replication. Supported by a Marie Skłodowska-Curie Postdoctoral Fellowship, I led two complementary projects that resolved a long-standing question in the field on how the DNA damage checkpoint protects replication forks from collapse. These findings resulted in two first-author publications in Molecular Cell (2025) and provide new insight into early cancer development and treatment resistance. I drove all aspects of these projects, including hypothesis generation, experimental design, funding acquisition, publication, and dissemination.

During the COVID-19 pandemic, I co-led a large interdisciplinary initiative to purify SARS-CoV-2 replication enzymes and screen for inhibitors. This collaboration resulted in seven Biochemical Journal papers (2021) and patent efforts for antiviral compounds. My role included conceptual design, coordination of project teams, development of purification and assay platforms, and public engagement, strengthening my leadership and translational research skills.

I have also contributed to high-impact collaborative projects (Cell 2023; manuscripts under review in Nature and Nature Communications), supervised undergraduate, MSc, and PhD students, and served on and chaired multiple institutional committees (PhD, postdoc, Athena Swan, Concordat, Flow



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Africa). In 2023 I secured Crick funding to extend my postdoctoral work, and in 2025 additional funding to develop and supervise an independent project generating preliminary data for my future group.

My goal is to uncover how fundamental DNA replication processes impact genome integrity, immunology, and cancer development, integrating biochemical, structural, and cellular approaches.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: QUEVEDO CALERO, MARTI
Referencia: RYC2025-057104-I
Correo Electrónico: quevedo.marti@gmail.com
Título: Multiomic Innovations for Plant Chromatin Dynamics

Resumen de la Memoria:

My research trajectory is defined by strong international experience, high adaptability, and constant technological innovation to study gene regulation. I began my scientific career in Spain, where early exposure to research in several leading institutes resulted in four co-authored publications as an undergraduate and provided a solid foundation in molecular biology and cell signaling. In 2013, I was awarded a highly competitive fellowship from the Netherlands Organization for Scientific Research (NWO) to pursue my PhD in the Netherlands at Erasmus MC in Rotterdam. There, I specialized in transcriptional and chromatin regulation, combining proteomics, ChIP-seq, and bioinformatics to map the interactome and genomic network of the Mediator complex in stem cells. This work led to a first-author publication in Nature Communications and additional collaborative papers in Human Molecular Genetics and Nucleic Acids Research, reflecting both my technical independence and my proactive outreach in building collaborations.

For my 4-year postdoc in Sweden, I shifted to the plant field. At the Umeå Plant Science Center (Sweden) and starting from a lab without established genomics workflows, I implemented state-of-the-art protocols including ChIP-seq, and the first chromatin immunoprecipitation-mass spectrometry (ChIP-MS) pipeline in plants. I became co-corresponding author of a Nature Communications study revealing how chloroplast signals reshape chromatin during early seedling development, and I established productive collaborations leading to excellent publications (co-1st author in Molecular Plant and 2nd author in the Plant Cell). This period consolidated my transition into plant epigenetics and demonstrated my ability to develop pioneering methodologies in new environments.

In 2023, I was awarded an MSCA-COFUND fellowship to join CRAG (Spain), where I launched my own independent research line integrating chromatin accessibility (ATAC-seq), transcription factor footprinting, CRISPR multiplex editing, and regulatory genomics to dissect stress-responsive cis-elements. I expanded my expertise into crop systems, supervised students, organized scientific activities, and strengthened my national and international network. Since 2025, I have joined Dr. Julia Qüesta's lab, contributing to projects on Polycomb regulation and chromatin topology while further developing advanced bioinformatic skills.

Building on this trajectory, my emerging research line focuses on uncovering the protein machinery that interprets and shapes the plant epigenome. I will develop cutting-edge chromatin-based proteomics to map the regulatory complexes associated with active, repressive, and enhancer-linked chromatin states. These proteomic discoveries will be integrated with functional genomics, CRISPR-based perturbations, and in planta phenotyping to determine the mechanistic roles of novel chromatin factors in developmental transitions and environmental responses. Ultimately, my goal is to establish a technologically innovative research program that reveals fundamental principles of chromatin regulation in plants while providing new molecular targets and tools with clear translational potential for crop improvement and synthetic biology.

Resumen del Currículum Vitae:

I am a molecular biologist specializing in chromatin regulation, transcription, and multi-omic technology development, with a strong trajectory across in eukaryotic biology. My career has been shaped by a continuous drive to implement pioneering experimental and computational approaches to understand how chromatin dynamics control gene regulation in response to developmental cues and environmental signals. After early training in Spain, I pursued a PhD in the Netherlands supported by a highly competitive NWO fellowship. During this period, I gained deep expertise in transcriptional networks, proteomics, and chromatin biology, culminating in a first-author Nature Communications paper where I mapped the Mediator complex interactome and its genome-wide regulatory network in stem cells. My capacity to develop innovative protocols and build collaborations led to additional publications in Human Molecular Genetics and Nucleic Acids Research.

Motivated by the translational potential of plant research and the conceptual appeal of studying chromatin in dynamic environmental contexts, I transitioned into plant systems during my first postdoctoral position at the Umeå Plant Science Center in Sweden. There, I established new genomics and epigenomics workflows and became co-corresponding author of a recent Nature Communications uncovering how chloroplast signals orchestrate chromatin transitions during early seedling development. In parallel, I pioneered a the first implementation of chromatin immunoprecipitation-mass spectrometry (ChIP-MS), work currently under revision. These efforts reflect my ability to import, adapt, and technically expand high-end methodologies into plant systems. Additionally, my expertise in bioinformatics and proactive networking is demonstrated by my two collaboration paper with Peter Kindgren's group (co-1st author in Molecular Plant and 2nd author in the Plant Cell)

Since returning to Spain with a prestigious MSCA-COFUND fellowship at CRAG, I have launched an independent research program integrating chromatin accessibility (ATAC-seq), transcription factor footprinting, CRISPR editing, and regulatory genomics to dissect cis-element control of stress-responsive transcription. My work has led to a second co-corresponding manuscript in preparation and multiple collaborations with leaders in CRISPR, epigenetics, and chromatin architecture. More recently, I joined Julia Qüesta's lab at CRAG to study Polycomb regulation and 3D genome dynamics, further expanding my mechanistic and bioinformatic expertise.

Across my career, I have demonstrated independence, leadership, and scientific maturity: obtaining competitive funding, supervising students, participating in teaching activities, coordinating international collaborations, organizing scientific events, and actively participating in outreach. I am now uniquely positioned to establish a research group focused on technological innovation in plant chromatin biology, developing next-generation proteomic and epigenomic tools with strong potential for scientific impact and translational applications in agriculture.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: PELLÓN RODRÍGUEZ, AIZE
Referencia: RYC2025-056397-I
Correo Electrónico: apellon@cicbiogune.es
Título: Deciphering Mucosal Epithelial Memory and Immunometabolism to Protect Homeostasis and Prevent Fungal Disease

Resumen de la Memoria:

With the Ramón y Cajal contract and my research programme, I aim to uncover the mechanisms underlying epithelial memory and its role in controlling fungal commensalism and infections. *C. albicans* is a common member of the human microbiota, colonising mucosal surfaces such as the oral and urogenital tracts. However, it is also the most clinically relevant fungal pathogen, and mucosal infections caused by *C. albicans* represent a major source of patient discomfort and a significant burden for healthcare systems worldwide.

Fine-tuning mucosal immune responses is essential to maintain homeostasis and prevent the commensal-to-pathogen transition of *C. albicans*. Innate immune cells, such as macrophages, can develop long-term responses known as innate immune memory (IIM) that enhance microbial clearance during systemic infections. These memory cells exhibit profound epigenetic and immunometabolic changes, preparing them for secondary challenges. Consequently, the nutritional environment plays a critical role in shaping immune functions.

At mucosal sites, where immune cells are less abundant, epithelial cells are key players, orchestrating complex immune responses and controlling fungal behaviour. While oral epithelial responses to acute *C. albicans* infections are well documented, no study to date has addressed their ability to generate memory or its impact on infection control and commensalism regulation. Furthermore, given the importance of metabolism and nutrient availability for both innate memory and fungal pathogenicity, I will also explore how altered nutritional environments, such as those observed in metabolic disorders or during dietary interventions, affect these processes.

Specific Aims

Aim 1 – INFECTION: Impact of epithelial and innate immune memory during mucosal fungal infections.

- Identify fungal factors driving epithelial memory and characterise memory phenotypes in vitro.
- Assess the impact of epithelial memory in murine models of mucosal candidiasis.
- Perform immunophenotyping and metabolic profiling of epithelial memory cells.

Aim 2 – HOMEOSTASIS: Role of epithelial memory and innate immune memory in fungal commensalism

- Determine the role of epithelial memory during fungal commensalism.
- Investigate how epithelial memory cells orchestrate immune responses to commensal fungi.
- Characterise microbiota alterations induced by epithelial memory.

Aim 3 – DISEASE: Characterise the effect of metabolic diseases on fungal pathogenesis and memory development at mucosae.

- Elucidate the impact of metabolic environments on acute mucosal candidiasis and epithelial memory.
- Identify key metabolites and metabolic pathways associated with susceptibility to fungal infections under altered metabolic conditions.

Expected Impact

These studies will provide novel insights into mucosal fungal immunology, advancing our understanding of host-microbe interactions and identifying molecular targets for therapeutic interventions. Ultimately, this research will contribute to the development of strategies to prevent and treat oral candidiasis, improve patient outcomes, and address the growing challenge of antifungal resistance.

Resumen del Currículum Vitae:

I am a microbiologist with a multidisciplinary background in host-microbe interactions, focusing on the regulatory mechanisms of mucosal immunity to pathogens and commensals. My research integrates three interconnected areas: (i) immunometabolism in immune regulation; (ii) the influence of nutrition and the metabolic microenvironment on immunity and microbial lifestyles; and (iii) development of innate immune memory by immune and non-immune cells.

I have published 34 research papers (11 in D1 journals, 26 in Q1), including 10 as first author and 3 as co-corresponding author, with an H-index of 15 (Scopus) | 19 (Google Scholar) and 990 | 1394 citations. I have contributed to 10+ research projects, including a European consortium on Lyme disease and an academic-industrial collaboration between King's College London and Unilever (BBSRC-funded). Recently, I secured my first project as Principal Investigator. I have also participated in two industry contracts, one as co-PI, and trained 20+ early-career researchers (BSc, MSc, PhD). Additionally, I have delivered lectures at EHU and King's College London.

My PhD (EHU, 2012-2016; funded by a competitive fellowship and awarded the Extraordinary PhD Prize) explored adaptive and innate immunity to *Lomentospora prolificans* and mechanisms of azole resistance, resulting in 14 publications, five as first author (Cellular Microbiology, Journal of Proteomics).

During my first postdoctoral stage at CIC bioGUNE (2017-2019), I investigated macrophage regulation by commensal microbes, demonstrating that gut bacteria induce metabolic shifts and long-term tolerogenic responses (innate immune memory). This led to a first-author paper in Gut Microbes



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

and eight collaborative publications. I also co-established the Monoclonal Antibody Production platform, enhancing the centre's research capacity and funding.

In 2019, I joined King's College London, supported by a Basque Government Postdoctoral Fellowship and later a BBSRC-funded project. I established a research line on immunometabolic reprogramming in oral epithelial cells during *Candida albicans* infection. I led (co-first and co-corresponding author) a paradigm-shifting study (second round of review in *Science Advances*) revealing that epithelial hexose metabolism is critical for oral candidiasis and benefits the pathogen, contrasting systemic infection scenarios. Despite COVID-19 disruptions (limited lab access for 1.5 years), I published seven additional papers, including another co-first/co-corresponding author paper, two reviews as first author, and secured a BBSRC International Institutional Award to initiate studies on epithelial memory.

Since July 2024, I am a Marie Skłodowska-Curie Postdoctoral Fellow at CIC bioGUNE, leading EPIMemory, a project on epithelial memory in *C. albicans* pathogenesis and commensalism. This fellowship consolidates my independence and positions me to establish my own research group. A Ramón y Cajal contract will allow me to strengthen Spain's leadership in fungal immunology and innate immune memory, and ultimately become a global reference in the field.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: FERNANDES ALVES, JOÃO MIGUEL
Referencia: RYC2025-054742-I
Correo Electrónico: jmfernandesalves@gmail.com
Título: Evolutionary genomics of tumor progression: from single cells to liquid biopsies
Resumen de la Memoria:

My scientific trajectory bridges evolutionary biology, cancer genomics, and translational oncology. After early international research experiences in Brazil and Malaysia, I completed a mixed PhD program between the University of Porto and the Instituto Gulbenkian de Ciência (Portugal), complemented by an EMBO fellowship at Universitat Pompeu Fabra (Spain). This training provided a strong foundation in population genomics and evolutionary inference, which later enabled my transition into cancer evolution.

As a postdoctoral researcher in the Phylogenomics Lab at the University of Vigo (Spain), I adapted evolutionary and phylogenetic concepts to somatic evolution, contributing to methodological advances in single-cell phylogenetics (CellPhy, SIEVE, Phylonco) and to high-resolution reconstructions of colorectal cancer (CRC) progression and metastatic relapse using single-cell and multi-region genome sequencing. These studies helped clarify how tumors diversify, disseminate, and evolve over time.

Importantly, I have also established an independent translational research line focused on liquid biopsies, supported by an AXA Research Fund project and an AECC Investigator Grant awarded to me as Principal Investigator. This work demonstrated that the genomic heterogeneity of circulating tumor cells (CTCs) carries prognostic value in metastatic CRC. Over the years, I have built a broad network of national and international collaborators spanning evolutionary modeling, high-throughput genomics, liquid biopsy research, and clinical oncology – a multidisciplinary environment that consistently strengthens and expands the scope of my research.

My future work will consolidate this translational direction in two complementary ways: (i) refining evolutionary metrics specifically tailored to liquid biopsy data (CTCs and ctDNA), and (ii) integrating evolutionary biomarkers into clinical pipelines in close collaboration with oncologists and clinical teams. These lines of research will allow me to interrogate how clonal diversity shapes cancer aggressiveness and how these features can be translated into actionable diagnostic and prognostic tools. Overall, my trajectory reflects a coherent evolution toward an independent research program that integrates an evolutionary framework with high-resolution genomics and clinical applications to anticipate tumour behaviour and improve patient outcomes.

Resumen del Currículum Vitae:

I am a researcher specialised in cancer evolution, population genomics and single-cell phylogenetics, with over 20 years of academic experience. My scientific career began in ecology and conservation genetics, followed by a mixed PhD at the University of Porto and the Instituto Gulbenkian de Ciência, where I studied the evolutionary history of human chromosomal inversions. This work provided a robust conceptual foundation in evolutionary processes and genomic inference.

After joining the Phylogenomics Lab at the University of Vigo, I applied these principles to somatic evolution in cancer. I have contributed to methodological advances in single-cell phylogenomics and to detailed genomic reconstructions of colorectal cancer (CRC) progression and metastatic relapse using multi-region and single-cell genome sequencing. My research integrates Bayesian evolutionary modelling and high-throughput genomics to dissect how tumours diversify, disseminate and adapt.

More recently, I have established an independent translational research line focused on liquid biopsies, supported by >€330,000 as Principal Investigator through an AXA Research Fund project and an AECC Investigator Grant. This work demonstrated that the genomic diversity of circulating tumour cells (CTCs) has prognostic value in metastatic CRC and has positioned me within strong clinical and translational collaborations centred on metastasis biology.

To date, I have authored 17 peer-reviewed publications (13 as first author), including articles in Nature Communications, Genome Biology, Genome Medicine and Cancer Letters, with >446 citations (h-index 11). I have participated in multiple competitive national and international projects, including ERC and EIC-Pathfinder projects.

My teaching contributions include workshops on computational phylogenetics and the co-supervision of two PhD theses (one completed, one ongoing), two MSc theses and an undergraduate research project. I have served on MSc and PhD examination committees and supported training and scientific dissemination activities.

I contribute actively to the scientific community as a reviewer for journals such as Nature Communications, Nature Ecology & Evolution, Genome Medicine, Bioinformatics and Molecular Biology and Evolution, and I serve on the Editorial Board of BMC Personalized Medicine. I am a member of major scientific societies in evolution (SMBE, ESEB, APBE), cancer research (EACR, ASEICA) and computational biology (SEBIBC).

My trajectory reflects international experience, methodological innovation, leadership in competitive funding and a consolidated path toward scientific independence. My work is now centred on translational cancer evolution, with the goal of generating fundamental insights into tumour progression while contributing to earlier detection, improved patient stratification and more effective clinical management.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: LEÓN SAMPEDRO, RICARDO
Referencia: RYC2025-055310-I
Correo Electrónico: rlsampedro85@gmail.com
Título: Ecological Rules of Genetic Invasion in Microbial Communities

Resumen de la Memoria:

Project Outline and Motivation

This proposal aims to establish a predictive ecological framework to explain why certain newcomers, whether genetic elements or bacterial strains, succeed or fail when entering complex microbial communities. While we know microbiomes are structured by competition, metabolic cooperation, and ecological filtering, we lack a mechanistic understanding of how these forces shape the fate of genetic invasions. My recent work demonstrates that the behaviour of mobile genetic element (MGE) associations is highly context-dependent: the same genetic combination can fail, remain neutral, or succeed depending entirely on the ecological structure of the resident community.

State of the Art

Current microbiome research has progressed from taxonomic description to uncovering ecological processes (e.g., resource competition, cross-feeding) that structure communities. However, these insights have not yet been connected to the behaviour of MGEs, which are typically studied in simplified, controlled conditions. This reductionist perspective fails to generalise to real ecosystems where ecological interactions reshape the effective fitness of genetic associations. My previous research challenges this static view by showing that plasmid success relies on ecological heterogeneity, exploiting permissive subpopulations, and rapid, host-specific compensatory evolution driven by trade-offs between resistance and fitness.

Proposed Research Objectives

The project aims to bridge the gap between community ecology and genetic dynamics through three integrated objectives, using high-risk plasmid-bacterium associations in gut-derived communities:

Objective I: Identify ecological mechanisms of establishment.

This objective focuses on the early phase of invasion. I will analyze three scenarios: (i) clinically relevant plasmid-host associations, (ii) rationally reconstructed associations, and (iii) de novo associations emerging during invasion. By testing these in controlled microbiome systems under varying resource and community structures, I aim to identify the specific ecological interactions that permit establishment. The central hypothesis is that invasion success is an emergent property defined by the interplay between intrinsic plasmid/host traits and the community interaction network.

Objective II: Determine how ecological context shapes evolutionary trajectories.

Once established, the long-term fate of a newcomer is constrained by its ecological context. I will track plasmid-host associations across contrasting microbiome environments (e.g., high vs. low competition) to determine how ecological filtering drives the adaptation of plasmids. I hypothesise that competitive, diverse communities restrict adaptation and favour collapse, whereas facilitative environments buffer costs and promote stabilisation.

Objective III: Derive predictive ecological rules.

To move from description to prediction, I will integrate the experimental outcomes from Objectives I and II with quantitative models (consumer-resource frameworks and extended Lotka-Volterra systems). The goal is to identify a small set of ecological parameters—such as functional redundancy, nutrient overlap, and interaction strength—that can reliably predict the emergence, persistence, or collapse of genetic associations across diverse communities.

Resumen del Currículum Vitae:

I am a microbial ecologist and researcher with a PhD in Microbiology from Complutense University of Madrid (2017, Summa Cum Laude) and expertise in antibiotic resistance evolution, microbial communities, and computational biology. Currently, I hold a Doctor FC3 position at the Dairy Research Institute of Asturias (IPLA-CSIC), where I research microbial community ecology and evolutionary dynamics.

My research integrates experimental microbiome systems, genomic analysis, and quantitative ecology to understand how mobile genetic elements carrying antibiotic resistance emerge and persist in complex microbial communities. This interdisciplinary approach has established me as an independent researcher capable of linking experimental systems to predictive theory.

I have published 22 peer-reviewed articles in the past 9 years in high-impact journals, including Nature Communications, Nature Microbiology, and the ISME Journal, accumulating over 1,800 citations with an h-index of 17. My work has received recognition, including the PRAN Best Publication Prize for contributions to clinical resistance understanding.

My academic trajectory spans institutions across Spain and Switzerland, including postdoctoral positions at ETH Zurich and University of Oxford, where I developed experimental systems quantifying how species interactions and metabolic dependencies determine resistant-strain success. I have supervised 9 students and contribute regularly to peer review and international conferences (ECCMID, FEMS, SMBE).

I prioritise active communication and collaboration with the clinical settings, emphasising open-access publication (70% of recent work) and delivering seminars to clinical microbiologists to advance community-level resistance thinking. My capacity to lead independent projects, integrate diverse methodologies, and establish original research directions positions me to develop coherent research programs addressing fundamental eco-evolutionary principles in complex microbial systems.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: SENA TORRALBA, AMADEO
Referencia: RYC2025-056227-I
Correo Electrónico: amase92@gmail.com
Título: From Nanobiosensing to Living Therapeutics: A Trajectory Toward Smart, Autonomous Infection Management

Resumen de la Memoria:

My research trajectory has evolved at the intersection of biotechnology, nanotechnology, and bioengineering, with a focus on applications in diagnostics. During my PhD, I made significant contributions to lateral flow immunoassays (LFIA), integrating advanced nanomaterials to expand their dynamic range, enhance sensitivity, and improve manufacturing reproducibility. This work resulted in high-impact publications, including a Chemical Reviews article and the first Nature Protocols tutorial for LFIA design and fabrication, both of which have become widely used international references.

As a postdoctoral researcher, I progressively developed an independent line of research focused on portable, sensitive, and scalable diagnostic systems. At the Polytechnic University of Valencia, I led developments in clinical and food safety biosensing, supervised students, and served as corresponding author on multiple publications. My research stays at the University of Antwerp provided expertise in microfabrication and hollow microneedle patches for minimally invasive monitoring, establishing a technological foundation for wearable biosensors. Later, during my Marie Skłodowska-Curie Fellowship at Columbia University, I further specialized in electrokinetic actuation and aptamer-based sensing for high-sensitivity point-of-care applications.

My recent collaboration with Prof. Pilar Domingo-Calap's group at I2SysBio introduced me to bacteriophage biology and its potential for diagnostic and therapeutic applications. Together, we demonstrated the phage-based detection of *Xanthomonas arboricola*, confirming its selectivity and suitability as a biological component for smart sensing systems. This experience revealed new opportunities for integrating phages, smart materials, and microdevices into autonomous diagnostic and therapeutic platforms.

The research line I propose, PATCH-IT, represents a natural yet clearly independent evolution of my previous work. Its goal is to develop the first microneedle patch capable of detecting infection through sentinel phage amplification and autonomously releasing therapeutic phages via enzyme-responsive polymeric gates. This concept establishes a new framework for living, closed-loop nanotheranostics, addressing the global challenge of antimicrobial resistance from a One Health perspective.

PATCH-IT builds on three pillars of my trajectory:

1. Quantitative, high-sensitivity diagnostics (LFIA and portable biosensors).
2. Wearable microneedle technologies (microfabrication and in-tissue sampling).
3. Phage-based sensing and therapeutics (I2SysBio collaboration).

I2SysBio is the ideal environment to consolidate this line, thanks to its expertise in phage therapy, systems biology, and virology. My incorporation will add a currently missing capability: smart nanobiosensors integrated into biomedical devices, enabling strong internal synergies and translational potential. My objective is to establish a competitive research group that integrates biotechnology, smart materials, and bioengineering to generate disruptive knowledge and high-impact clinical and technological solutions.

Resumen del Currículum Vitae:

My scientific career combines biotechnology, nanotechnology, materials science, and bioanalytical chemistry to develop next-generation biosensing technologies for clinical diagnostics, environmental monitoring, and food safety. Over the course of nine years, I have progressed from contributing to interdisciplinary nanobiosensing projects during my PhD to leading independent research lines as a postdoctoral fellow. This trajectory has resulted in 30 peer-reviewed publications (15 first/co-first author, 10 corresponding author), 2 patent applications, 6 funded research projects, and an h-index of 14 (1,775 citations). It reflects a consistent capacity to produce impactful, internationally visible research and to translate technological innovation toward societal applications.

My training includes a PhD in Biotechnology (cum laude; two thesis awards) from the Autonomous University of Barcelona, followed by postdoctoral fellowships at the Polytechnic University of Valencia (Juan de la Cierva; Margarita Salas; CIAPOS), the University of Antwerp (FWO), and Columbia University/ISGlobal as a Marie Skłodowska-Curie Postdoctoral Fellow. I have completed international research stays in Taiwan, Belgium, and the USA, strengthening my expertise in microfabrication, microneedle-based sensors, and aptamer-based analytical platforms.

I have taken increasing leadership in research: I have served as corresponding author in 10 publications, supervised 6 undergraduate students, 1 master's student, and 1 PhD student, and acted as PI of a funded project by the MSUD Family Support Group (USA) for developing a home-based molecular diagnostic test. I have participated in multidisciplinary projects involving malaria prognosis, chronic wound biomarkers, airborne pathogen detection, and multiplexed allergen quantification (project budgets of up to approximately €430k). My research has been disseminated through invited oral presentations (TNT2022; IWOSMOR; Red Nacional de Sensores y BioSensores Ópticos), contributions to international conferences, a book chapter invited by Academic Press, and national media coverage.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have demonstrated the capacity to develop original technological concepts, such as electrophoretic lateral flow assays, ratiometric fluorescent LFAs, microneedle-integrated diagnostics, and smartphone-readable biosensors, and to carry them from conceptualization to validation. This scientific independence is evident in my role as corresponding author, my supervisory activities, my leadership in industrial collaborations, and the continuity of my research lines across institutions.

Building on this background, I have defined an emerging and fully independent research programme focused on wearable microneedle patches for automated phage-based therapy, integrating biosensing, controlled drug delivery, and One Health perspectives. This research line is distinct from that of my previous supervisors and forms the basis of the ERC Starting Grant proposal (101302701-PATCH-IT, 2025) that I recently submitted. The coherence, maturity, and translational potential of my trajectory position me as a strong candidate for developing a competitive and sustainable research group within the Ramón y Cajal programme.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: MOLINA GARCÍA, LAURA
Referencia: RYC2025-056352-I
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Título: Development of novel genetic tools to understand the role of gut bacterial amyloids in host amyloid aggregation and brain function

Resumen de la Memoria:

Amyloid aggregation is a hallmark of many neurodegenerative diseases that affect millions of people worldwide. The initial step triggering the aggregation cascade is still unknown. It is proposed that bacterial amyloids produced in the gut may catalyse the aggregation of human amyloids, yet in vivo evidence unambiguously demonstrating such mechanism is still missing. In addition, whether different bacterial amyloids produced by the microbiota could modulate host-amyloid aggregation in vivo in a protein-specific manner is unknown. As a molecular biologist with over 15 years of experience in the microbiology and neuroscience fields, my goal is to determine whether a causal relation exists between amyloid-producing gut bacteria and the onset and progression of neurodegenerative diseases.

My PhD work at CIB covered different aspects of bacterial amyloid biology, including function, toxicity and the development of tools to screen for potential therapies. As a result, I contributed to the field with 1 patent and 7 publications (6 as first author). Additionally, I independently established a collaboration which resulted in 2 second author papers in the field of plasmid biology. By the end of my PhD I had a very clear long-term scientific objective: to study the role of gut bacterial amyloids in neurodegeneration.

To achieve my scientific goals, I focused my postdoc on gaining neurobiology skills in the nematode *Caenorhabditis elegans*. Funded by the competitive Newton International Fellowship, I moved to UCL (UK) to study the molecular mechanisms underlying learning in *C. elegans*. My postdoc has allowed me to learn state-of-the-art techniques to interrogate neural circuits and analyse behaviour as well as collaborate with world leading scientists. My contribution to the field of behavioural neuroscience is reflected in: 1 first author paper (Molina-García et al., 2020) where we updated the neuroanatomy of *C. elegans* and its mating sequence with the discoveries of the PHD neurons and the Molina manoeuvre, respectively; 1 first and co-corresponding author paper on how conflicting experiences are integrated during learning (Molina-García et al., 2024), 1 review on sexually dimorphic learning strategies across species; 1 dispatch article on how neuropeptides modulate behaviour (Molina-García & Barrios 2018; 2021) and 1 second author paper on how homeobox genes encode *C. elegans* male nervous system (Fernández et al 2025).

For my independent research, I am combining my skills in both models: bacterial amyloids and *C. elegans* to design genetic tools that provide mechanistic insights into which and how gut bacterial amyloids promote the aggregation of human amyloids in the nervous system and modulate brain function. In 2022, I was awarded a UCL Early Career Researcher grant to initiate my independent research and in 2023 an AEI R3 certificate and an Atracción de Talento grant to start my group at CNB-CSIC (in July 2024 after my maternity leave). In 2025, I was awarded my first PID project (AEI-MICIU) and a CNB synergistic project as PI and coordinator. These awards highlight the relevance and impact that my proposed research line will have on the neuroscience field. The award of a RyC grant will allow me to attract other sources of funding and uniquely place me to become an international leader in the field of microbiota-modulation of the nervous system.

Resumen del Currículum Vitae:

I have been independently funded at every stage of my scientific career (attracting >680k € in funding). This funding has allowed me to work in 7 research institutes across 4 different countries: (Spain (UCM, CIB-CSIC, CNB-CSIC), France (CRI, Paris), UK (UCL, LMCB), USA (MBL).

Funded by a FPI fellowship I did my PhD at CIB (2015) where I studied different aspects of bacterial amyloid biology, including their function (Molina-García et al., 2016), toxicity (Molina-García et al., 2014; 2017) and I developed tools (that we patented) to screen for potential therapies against amyloid aggregation (Molina-García & Giraldo, 2017). As a PhD, I visited the CRI in Paris to study amyloid propagation dynamics in bacteria using microfluidics. In 2016, I moved to UCL funded by the prestigious Newton International Fellowship awarded by The Royal Society (UK), which aims to attract international talent to the UK. At UCL I led a project investigating the mechanisms underlying associative learning in *C. elegans* (Molina-García et al., 2024). In 2018, data from this project allowed us to obtain a Leverhulme Trust Research Grant. At UCL I also led an international collaboration where we updated the neuroanatomy of *C. elegans* males and its mating sequence with the discoveries of the PHD neurons and the Molina manoeuvre, respectively. These projects led to 4 first author (1 as corresponding) papers (Molina-García et al., 2018; 2020; 2021; 2024).

I am author of 14 publications in scientific peer-reviewed journals (250 citations, h-index: 8). I am first author in 10, corresponding in 1 and a sole author with my supervisors in 4.

The impact of my work in the fields of molecular microbiology and behavioural neuroscience is reflected in press-highlights of my work (Molina-García et al., 2020; 2024), the invitation to write an outreach article for The Node and to teach in the prestigious MBL NS&B summer course in Woods Hole (2019, USA). I have also been invited to review articles in relevant journals of my field, be Guest editor for JOVE and edit a research topic in Front Cell Neurosci. Additionally, I have been invited to present my work at 38 conferences, where my research has been recognised with several awards.

At UCL I co-supervised 16 people (1 PhD, 2 research assistants, 4 BSc and 9 MSc students). At UCL I also contributed to teaching as demonstrator (2016-2023) invited lecturer and tutor, and lead the worm branch of the invertebrate media facility (2020-2023). These experiences provided me with outstanding management, communication and leadership skills to drive successful research projects. In 2022, I was awarded a UCL Early Career Researcher grant to initiate my independent research and in 2023 an AEI R3 certificate (recognising my trajectory) and an Atracción de Talento grant to start my group at CNB-CSIC (where I joined in July 2024 after my maternity leave) studying how host-microbiome interactions promote neurodegeneration. As PI, I have: supervised 2 TFGs, taught at 2 UAM Masters, been awarded my first PID-2024 project and a CNB synergistic project as PI and project coordinator, obtained 2 funded JAE Intro students, participated in 3 PhD evaluation committees, been invited speaker to SEM (2025) and IV Latinamerican *C. elegans* EMBO (2026) meetings. I am part of the CNB Advanced Biotechnology of the Microbiome commission and TAC member (CNB PhD CaRe program).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: VILA PUEYO, MARTA
Referencia: RYC2025-054644-I
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Título: Investigación multidisciplinar en migraña

Resumen de la Memoria:

I have 14 years of experience within the field of headache. During my PhD, performed at Vall Hebron Institute of Research (VHIR), I studied the genetic and epigenetic mechanisms involved in migraine pathophysiology using clinical and preclinical studies; I performed a secondment at King's College London (KCL) where I learnt new migraine animal models that I brought back to my institution; and I became a member of the International Headache Genetics Consortium. Moreover, I published 10 papers, I participated at 20 conference abstracts, 5 of which as first and presenting author. After obtaining my PhD, for which I got the PhD extraordinary award at my university, I was a Postdoctoral researcher at KCL for 7 years. During this period, I used several preclinical models of migraine and other primary headache disorders to better understand the pathophysiological mechanisms that underlie them. Of note, I studied the implication of a nuclei of the brainstem, the locus coeruleus, in migraine by using in vivo electrophysiological recordings. Also, I studied the mechanisms of several pharmacological treatments in migraine and trigeminal autonomic cephalalgias using in vivo electrophysiology and studying different molecular targets. After returning from my second maternity leave in 2021, I started my independent career as the PI of the preclinical research line at the Migraine Brain Adaptive Centre (VHIR) thanks to having been awarded the Sara Borrell contract (ISCIII), the Marie Curie Individual Fellowship (EC) and the Junior Leader Fellowship (La Caixa); and thanks to receiving funding from three projects as PI (MICIU, La Caixa, Fundación Eugenio Rodríguez Pascual). Currently I am leading a group formed by a PhD, an MSc student, an Erasmus student and a lab technician.

Resumen del Currículum Vitae:

My experience and qualifications confirm that I am an appropriate candidate to obtain the Ramon y Cajal contract as I have become an established independent researcher in my field, which has been confirmed with the recent obtention of the R3 certificate (2024). During my research career, I have acquired the necessary skills and experience to lead an efficient research group. I have the ability to independently organize my work, obtain financial support, manage a laboratory, teach, network and collaborate. I have demonstrated a genuine interest and motivation in all aspects of project development such as actively participating in the generation of new hypotheses, writing of proposals, setting up new methodologies, analyses of results, writing articles (I have published 29 SCI papers (55% on 1st decile; of which 7 as first author, 5 as senior author and 2 as corresponding)), and attending conferences (I have attended 32 conferences, of which 13 are oral presentations as first author). I am also an active member of the scientific community participating in several scientific societies, including the International Headache Society and the Society for Neuroscience; and international consortia, such as the International Headache Genetics Consortium. I have also been invited to become a member of the editorial boards of Cephalalgia, Brain Sciences, the Journal of Headache and Pain and the Frontiers in Pain Research-Headache (some of the most relevant journals of my field); to give 10 faculty talks at national and international conferences; to regularly review articles for international journals and projects for funding agencies, and to become guest editor of special issues. These experiences have all promoted my internationalization and visibility and have fostered my international network of collaborations. Furthermore, I have obtained financial support to cover my personal salary and to develop research projects, including 9 fellowships, 4 awards and 4 projects as PI, demonstrating that I am capable of acquiring funding to achieve my research goals.

I have more than 14 years of experience in the field of headache. This has been acquired during my PhD at VHIR (Barcelona) and my Postdoc at King's College London (7 years), where I studied the mechanisms of migraine using preclinical models. There I also started leading research projects as PI and supervising undergraduate, MSc and PhD students. After returning from maternity leave in 2021, I started my independent career as the PI of the preclinical research line at Vall d'Hebron Institute of Research thanks to having been awarded the Sara Borrell contract (ISCIII), the Marie Curie Individual Fellowship (EC) and the Junior Leader Fellow (La Caixa); and thanks to receiving funding from three projects as PI (MICIU, La Caixa, Fundación Eugenio Rodríguez Pascual). Currently I am leading a group formed by a PhD, two MSc students, an Erasmus student and a lab technician.

Since being a PhD student, I have mentored undergraduate, MSc and PhD students (more than 20 in total), leading their research projects and providing them the necessary skills to successfully accomplish their goals in research. Moreover, I have experience in academia, including being a tutor, a teaching fellow and a marker in MSc programs at King's College London; being a member of a PhD jury in 2 occasions and holding the Lecturer c



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: ORTEGA MORENO, PEDRO
Referencia: RYC2025-055947-I
Correo Electrónico: pedroortegamoreno@gmail.com
Título: Causes and Pathological Consequences of DNA Breaks
Resumen de la Memoria:

Influence of chromatin and transcription in genome stability:

Genetic information must be safely stored in the DNA molecule and faithfully replicated. However, during DNA replication, replication forks encounter obstacles that lead to DNA breaks, which are preferentially repaired with the sister chromatid. During my PhD, I identified two histone deacetylases, Rpd3L and Hda1, which facilitate the repair of replication-associated breaks by promoting cohesion between sister chromatids (Ortega et al 2019, Nat Commun; Ortega et al. 2021, DNA Repair). In addition, I demonstrated that after break-induction, DNA-RNA hybrids form fortuitously at DNA breaks and must be removed to allow repair (Ortega et. al 2021, eLife). In addition, I identified two histone mutations that increase DNA damage (Ortega et al. 2020, Microb Cell), and I collaborated in the identification of Yta7 and Rrm3 as new factors involved in replication fork stability (Chacin et al. 2020, Nat Commun & Muñoz-Galván et al. 2017, PLOS Genet).

Role of APOBEC3A and APOBEC3B in genetic instability and cancer:

APOBEC3A (A3A) and APOBEC3B (A3B) are cytosine deaminases that protect cells from viruses. However, they also generate mutations in 70% of human cancers. During my postdoc and to define how A3A/B shape cancer genomes, I developed Oligo-seq, a sequencing-based method that identifies sequence contexts favoring A3A/B activity (Ortega et al. 2025, STAR Methods; & Sanchez et al. 2023, Nat Commun). Next, to understand how A3B contributes to genetic instability, I treated cancer cells with agents that generate single-stranded DNA (ssDNA), the preferred substrate of A3B. I found that ATR inhibition leads to PARP1 activation in A3B-expressing cells. Mechanistically, I found that during ATR inhibition, A3B leads to cytosine deamination on ssDNA into uracils, which are removed by UNG2. The resulting abasic sites are cleaved by APE1, leading to fork breakage and PARP1 activation (Ortega et al. 2025, Science Advances).

Role of the innate immune system upon viral infections and genotoxic stressors:

Upon encountering various cell stressors, cells initiate specific responses to modulate transcription and translation. During my postdoctoral studies, I collaborated in the discovery of a role for APOBEC3B and PACT in the modulation of the innate immune response after viral infection (Manjunath et al. 2023 & 2025, Nat Commun), and a role for ATM and IRAK1 in the modulation of the immune response after genotoxic stress (Bournique et al. 2025, Nat Struct Mol Bio). In addition, I collaborated with Dr. Tinoco to uncover the role of HMGB2 in antiviral defense and cancer (Neubert et al. 2023, Nat Commun).

Line of research: Deciphering and targeting replication stress in cancer.

Cancer cells face high replication stress, making them dependent on DNA repair. PARP inhibitors exploit this but are limited by applicability and resistance. Co-inhibition of PARP and ATR synergistically increases cell death, yet, the underlying mechanism remains unclear. I aim to uncover how ATR and PARP co-inhibition kills cancer cells. Using dual CRISPR-Cas9 screens, I will identify genes required for cell death, map DNA lesions caused by this therapy, and perform biomarker analyses to predict response. This work will reveal vulnerabilities specific to ATR and PARP co-inhibition and guide personalized cancer treatments

Resumen del Currículum Vitae:

I have dedicated my scientific career to investigating the causes and consequences of DNA breaks and their contribution to cancer development. My research began as an undergraduate in Dr. Aguilera's laboratory, where I showed that specific histone mutations promote DNA breaks (Ortega et al. 2020, Microbial Cell). In 2016, I continued in Dr. Aguilera's laboratory for my FPU fellowship-funded PhD, studying how chromatin and transcription regulate DNA break repair while teaching at the University of Seville. This work resulted in 4 first-author and 4 co-authored publications. I identified a role for histone deacetylases in repairing replication-associated breaks by promoting sister chromatid cohesion (Ortega et al. 2019, Nat. Commun.), and developed methodologies to study the repair of DNA breaks at actively transcribed loci, showing that DNA-RNA hybrids accumulate at breaks and impede repair (Ortega et al. 2021 eLife; Gómez-González et al. 2021. Methods Enzymol.). I also led a review on the interplay between chromatin, transcription and genome stability (Ortega et al. 2021, DNA Repair), established an international collaboration (Chacin et al. 2021, Nat. Commun.), contributed to 3 additional publications, and presented my work at multiple conferences and outreach events. My PhD was awarded "cum laude" and the Extraordinary PhD Award.

Motivated to translate mechanistic insights into clinically relevant research, in 2021 I joined Dr. Buisson's laboratory at the University of California, Irvine, a leading group studying APOBEC3B, a cytosine deaminase linked to cancer progression. My postdoctoral work has resulted in 2 first-author and 6 co-authored publications. Supported by a California Institute for Regenerative Medicine fellowship, I created Oligo-seq, a sequencing-based method to identify DNA sequence contexts that promote APOBEC3 mutagenesis (Sanchez et al. 2023, Nat. Commun.; Ortega et al. 2025, STAR Protocols), and established multiple international collaborations (Neubert et al. 2023, Nat. Commun.; Wu et al., under review at NAR; Folkerts et al., submitted). I then obtained an EMBO Postdoctoral Fellowship and led a project demonstrating that APOBEC3B-expressing cells are highly sensitive to combined ATR and PARP inhibition, an important finding given that PARP inhibitors are the only available drugs targeting replication stress in cancer



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

(Ortega et al. 2025, Science Advances). This work was selected for three oral presentations, including at the 6th International Deaminet Conference, where I received the 1st Place Presentation Award. In parallel, I contributed to research uncovering new regulators of innate immunity during viral infection and DNA damage (Manjunath et al. 2023, Nat. Commun.; Manjunath et al. 2025, Nat. Commun.; Bournique et al. 2025, Nat. Struct. Mol. Biol.). Beyond research, I have trained 2 undergraduate and 6 graduate students, supported one in securing a PhD position at the University of Washington, participated in public outreach through UCL's Anti-Cancer Challenge, completed the EMBO Leadership course, and reviewed manuscripts for Science, Communications Biology and DNA Repair.

Overall, I have participated in 13 research projects, published 18 papers (6 first-author, 6 second-author), presented at 15 conferences, mentored 8 students, and participated in 17 outreach activities.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
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Título: Patient-guided synthetic community design for enhancing gut microbiome resilience against infectious diseases

Resumen de la Memoria:

The intestinal microbiota plays a vital role in human health, influencing immune development, nutrient processing, and pathogen resistance. These protective functions are especially important for immunocompromised individuals, such as people with HIV, cancer patients, and the elderly. These patients are highly vulnerable to infections, including those caused by antibiotic-resistant bacteria. Although clinical studies suggest links between microbiota composition and infection outcomes, the complexity of the microbiome has made it difficult to identify causal mechanisms. My research aims to fill this gap by integrating synthetic community design, microbiota research, infection biology, and clinical cohort data to uncover mechanisms of microbiota resilience to infection in vulnerable patients. My expertise and training provide me with the foundation to lead this research independently, advance new concepts in microbiome studies, and establish myself as an internationally recognized researcher.

I am a microbiome researcher specializing in the human gut microbiome, with a Bachelor's in Life Sciences and a Master's in Cell and Molecular Biology. My PhD at the University of Würzburg, Germany, expanded my expertise in infection biology, including work with enteric pathogens, high-throughput sequencing, microscopy, and tissue culture techniques. With seven years of postdoctoral experience, including a maternity leave, I have specialized in microbiome research involving anaerobic microbiology, genetics, and gnotobiotics. I completed four years of postdoctoral work at Yale University in the United States and, since 2022, I have been a senior postdoc at the Helmholtz Centre for Infection Research (HZI) in Germany. My interdisciplinary approach combines infection biology and microbiome research, including novel techniques like lineage barcoding to track real-time evolution in the gut and designing synthetic gut communities to study microbial interactions.

My research contributions are reflected in eleven publications in leading journals (Cell Host & Microbe, Nature Microbiology, EMBO Journal, Nature Communications, and Cell Reports), including five first-author papers. I have successfully secured competitive funding at every stage of my career, including a Master's fellowship at the American University of Beirut, a PhD fellowship at the University of Würzburg, and research grants in the USA and Germany, including an HZI-EMBL joint grant.

I have built a global collaboration network with leading institutions, including Yale University, Memorial Sloan Kettering Cancer Center, and Helmholtz and EMBL institutes. This network enhances the interdisciplinary scope of my research, complementing my expertise and enabling innovative projects. To disseminate science and establish my independent impact, I have taken on leadership roles at international conferences as a senior scientist, organizer, and chair. In mentoring, I have supervised three PhD students and two Master's students, many of whom have co-authored publications and advanced to research careers. My success in securing funding, building collaborations, and reviewing for leading journals highlights my independence and leadership, positioning me to establish my own lab and advance impactful research on microbiota resilience to infection in vulnerable patients.

Resumen del Currículum Vitae:

I am a microbiome researcher focused on the human gut microbiome, holding a Bachelor's in Life Sciences and a Master's in Cell and Molecular Biology. Supported by a competitive scholarship, I completed my Master's at the American University of Beirut, where my thesis on bacteriophage evolution led to a first-author publication in the Tawk et al., Journal of Bacteriology (IF: 3.2) that was featured on the journal's cover.

In 2012, I joined Prof. Jörg Vogel's lab at the Institute of Molecular Infection Biology in Würzburg, Germany, as a PhD student, supported by a competitive 3-year fellowship. In my doctoral work, I uncovered a novel autonomous cell-intrinsic immune mechanism and established a collaboration with Prof. Philippe Sansonetti at Institut Pasteur, which resulted in a first-author publication in The EMBO Journal (Tawk et al., 2018, IF: 11.2). I completed my PhD summa cum laude in 2017, contributing to four peer-reviewed publications, including two first-author papers (Tawk et al., 2018 EMBO Journal; Tawk et al., 2017 Scientific Reports, IF: 4.1). I established the anaerobic microbiology techniques for *Fusobacterium nucleatum*, an important colorectal cancer-associated strict anaerobic bacterium, and trained a PhD student on the project. Our work together resulted in a publication in Nature Microbiology (Ponath, Tawk, et al., 2021 Nature Microbiology (IF: 30.96)).

In 2018, I joined Prof. Andrew Goodman's lab at Yale University in the United States to expand my expertise in gut microbiome research. I developed an experimental evolution approach revealing how *Bacteroides thetaiotaomicron* adapts to infection, leading to a first-author publication (Tawk et al., Cell Host & Microbe, IF: 20.6) and a highlight in Nature Reviews Microbiology. For this study, I established a collaboration with the Memorial Sloan Kettering Cancer Center in New York to perform cecal metabolomics. I also organized the Gordon Research Seminar on Microbial Adhesion and Signal Transduction in 2019. During this time, I trained a PhD student and a Master's student, contributing to their ongoing research efforts.

In 2022, I joined the Helmholtz Centre for Infection Research (HZI) in Germany as a senior postdoctoral researcher, where I developed synthetic community models to study the mechanisms of microbiome resilience. I secured a competitive HZI-EMBL grant that enabled a research stay at EMBL, Heidelberg (Germany), to apply systems biology approaches to uncover dietary factors shaping microbiome dynamics. After taking maternity leave, the project's main manuscript (Tawk (CA) et al., 2025) is now under revision at Nature Microbiology. During this period, I co-authored four additional publications, including a second-author paper in Cell Host & Microbe and others in Nature Communications and Cell Reports. Recognized for my expertise in gut microbiota colonization resistance, I was invited by Cell Chemical Biology to contribute a commentary. I have also mentored a Master's student and I am co-supervising a PhD student.

I have been invited as a speaker and chair to international conferences such as the Gordon Research Conferences and the EMBL symposia, and I served as a peer-reviewer for leading journals. I also taught courses in gene editing and microbiology at the University of Würzburg, contributing to both graduate and undergraduate programs.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: STAMMNITZ, MAXIMILIAN
Referencia: RYC2025-054314-I
Correo Electrónico: maximilian.stammnitz@crg.eu
Título: A genomics journey: from transmissible cancer evolution to environmental biosensing and bioengineering
Resumen de la Memoria:

Throughout my career I have worked on environmental and medical genomics projects, mainly at the University of Cambridge (UK) and at the Centre for Genomic Regulation (CRG, Barcelona). My PhD on transmissible cancers in Tasmanian devils provided me with a solid training in bioinformatics, molecular evolution and conservation genomics. Building on this, I now develop genomics technologies in two directions: nanopore sequencing for environmental DNA (eDNA) monitoring and mutagenesis screens of environmental sensor proteins. Across these One Health projects I have led international collaborations, produced open, reusable workflows, datasets and publications, translating my findings into tools used by conservation practitioners and environmental monitoring programmes.

As a postdoc in Ben Lehner's laboratory (CRG) I developed GluePCA (doi:10.1101/2025.05.30.656975), a deep mutational scanning method to quantify how mutations affect small-molecule-inducible protein-protein interactions. Using the phytohormone receptor PYL1, I generated >40,000 variant measurements and combined them with AI-based structural models to map how mutations tune baseline activity, ligand sensitivity and signal strength. This revealed protein stability as the main determinant; I also uncovered rare "dose-response inverter" variants that flip PYL1 from an OFF-ON to an ON-OFF switch. I now lead a range of collaborations and actively supervise students to extend GluePCA to other environmentally relevant receptors and molecular glue systems. Together, we are mutationally engineering these receptors into new biosensors for xenobiotics.

In parallel I have helped establish nanopore-based eDNA for biomonitoring. As co-first author of a recent study (doi:10.1038/s41559-025-02711-w) I showed that airborne eDNA shotgun sequencing enables rapid characterisation of whole biomes and phylogenetic placement of organisms, leading core bioinformatics analyses. In an earlier effort with the same team (doi:10.1038/s41559-023-02056-2) I developed a computational pipeline to detect human deletion polymorphisms in nanopore eDNA data, quantifying human genomic "bycatch" and discussing its dual-use potential. These findings motivated my involvement in ethical and regulatory discussions around genomics technology (e.g. doi:10.1038/s44319-024-00264-w).

During my PhD I studied the somatic evolution of Tasmanian transmissible devil cancer lineages (doi:10.1126/science.abq6453), contributing to fieldwork and tumour genome analyses. Mainly with my colleagues at the Sanger Institute I performed pharmacogenomic screens on devil tumour cell lines (doi:10.1016/j.ccell.2018.03.013) and co-developed a diagnostic assay now routinely used in the field ("Tasman-PCR", doi:10.1098/rsos.180870).

I am an active science communicator, and have organised regular public outreach events, media and citizen-science campaigns. With a record of independence supported by competitive fellowships (Gates Cambridge, EMBO, Marie Curie), I co-supervise two PhD students and have previously overseen five master's projects that led to student co-authored publications. As a future Ramón y Cajal fellow, my goal is to build an independent group in Spain that unites deep mutational scanning of environmental sensor proteins with high-resolution eDNA analyses to address broad questions under a One Health theme.

Resumen del Currículum Vitae:

I am a computational and experimental biologist specialising in environmental and medical genomics. I obtained my MPhil and PhD degree from the University of Cambridge, where I investigated the somatic evolution and therapeutic vulnerabilities of transmissible cancers in Tasmanian devils by combining large-scale sequencing, pharmacogenomics and bioinformatics. During my PhD, I led several studies as first author in high-impact journals, including Science and Cancer Cell, and also contributed to an international consortium that reconstructed the global expansion of canine transmissible cancer.

In my postdoctoral work at the Centre for Genomic Regulation (CRG, Barcelona), I have developed a new deep mutational scanning method (GluePCA) to dissect the genetic architecture of hormone receptors and molecular glue systems, generating extensive sequence-function maps and integrating them with AI-based structural biology models. In parallel, I have played a leading role in applying nanopore sequencing to eDNA from diverse substrates: I am co-first author of a recent Nature Ecology & Evolution paper that establishes airborne eDNA shotgun sequencing as a rapid, portable approach to characterise biomes, population genetics and genomic variation, and I have co-led work on human genomic bycatch in eDNA and its ethical implications, which received broad international media coverage.

I have demonstrated independent scientific leadership as a founder of the PuntSeq project (nanopore-based monitoring of the River Cam), where I coordinated a team of ~15 early-career researchers, secured competitive public-engagement funding and designed outreach activities. Building on this experience, I co-founded the international PyriSentinel consortium (>€1.5M EU Interreg POCTEFA funding), which uses long-read eDNA genomics approaches to monitor more than 300 high-mountain lakes in the Pyrenees, in close collaboration with national parks and other stakeholders.

Over the course of my PhD and postdoc I have supervised and co-supervised master's and PhD students at Cambridge University, CRG and the Wellcome Sanger Institute. I maintain intensive outreach and policy-facing activities with environmental managers and policymakers on biodiversity genomics and eDNA regulation. Across these One Health projects I have led the production of open, reusable workflows, datasets and publications, translating my findings into tools used by conservation practitioners and environmental monitoring programmes.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: CARDENAS INOSTROZA, PABLO DAVID
Referencia: RYC2025-054984-I
Correo Electrónico: pdcardenas@plen.ku.dk
Título: Plant Bioengineering for Resilient Local Crops

Resumen de la Memoria:

My scientific trajectory has focused on understanding how and why plants produce specialized metabolites, particularly bitter, anti-nutritional, and insect deterrent compounds such as saponins and glycoalkaloids. During my PhD, I identified and characterized key biosynthetic and regulatory genes in Solanaceae, including the discovery of GAME9 as a master regulator of steroidal glycoalkaloid biosynthesis and GAME31 as a crucial step for generating bitterless tomatoes and insect deterrent potatoes. As a Marie Skłodowska-Curie Fellow and currently Assistant Professor at the University of Copenhagen, I expanded this research to non-model wild species, integrating metabolomics, transcriptomics, molecular biology, and plant-insect interactions. During this period, I established a stable transformation protocol for *Barbarea vulgaris* and generated molecular and phenotypic evidence demonstrating the food potential of *Chenopodium album*, consolidating an independent research profile at the interface of plant specialized metabolism, bioengineering, and rapid domestication.

The research line proposed here builds directly on this foundation and represents a decisive step forward. Its goal is to establish the molecular, analytical, and technological basis required to domesticate local wild plants and develop them into resilient and nutritious crops. The programme will continue my work with *C. album*, where omics and phenotypic resources are already available, and will expand to additional local *Amaranthaceae* species with high nutritional and agronomic potential.

The strategy integrates three components. Discovery platforms will combine genomics, transcriptomics, metabolomics, phenotyping, and artificial intelligence to identify the molecular determinants of traits such as bitterness, flowering, architecture, and seed quality. Implementation platforms will establish gene editing, transformation methods, and speed breeding to modify these traits efficiently. Evaluation platforms will assess the nutritional, sensory, and functional properties of improved lines. Together, these components create a coherent pipeline connecting fundamental discovery with the development of new plant-based foods.

This line represents a clear evolution from my previous work. While rooted in my expertise in specialized metabolism and wild species biology, it expands toward a comprehensive domestication programme that links molecular mechanisms with agronomic performance and food science. It establishes a long-term independent research direction with strong scientific, agricultural, and societal relevance in a Spanish context with global implications. The scale and ambition of this research line make it well suited for major competitive funding, including European programmes.

Resumen del Currículum Vitae:

I am a Bioengineer and PhD in Plant Sciences with international research experience in Chile, Israel, and Denmark. My work focuses on plant specialized metabolism, molecular biology, biochemistry, metabolomics, and their application to the development of resilient and nutritious crops based on wild species. I have published 14 peer reviewed papers, including six first author publications, as well as contributing author papers in leading journals such as *Nature Communications*, *Science*, *New Phytologist*, and *Phytochemistry*. I am corresponding author on a preprint and a review currently under evaluation, reflecting the consolidation of my independent research line. My doctoral research uncovered key regulatory mechanisms of glycoalkaloid biosynthesis in Solanaceae, including the discovery of the transcription factor GAME9 and additional enzymatic steps involved in the biosynthesis of bitter and insect deterrent compounds.

Following my PhD in Israel, I was awarded a Marie Skłodowska Curie fellowship to conduct research at the University of Copenhagen, where I currently hold a position as Assistant Professor and Novo Nordisk Foundation Emerging Investigator. During this stage, I consolidated my independence by leading projects that integrate metabolomics, plant-insect interactions, gene function analysis, and rapid domestication approaches. I established a stable transformation protocol for the wild Brassicaceae *Barbarea vulgaris* and generated genomic, metabolomic, and phenotypic resources for *Chenopodium album*, demonstrating its food potential and positioning it as a promising candidate for development into a future crop.

I have obtained competitive funding as principal investigator (EUR 2.6 million to date), supervised one postdoc, three PhD students, and multiple MSc and BSc students, and built multidisciplinary collaborations with international leaders in molecular modelling, food science, and artificial intelligence. My expertise spans omics, plant molecular biology, transformation and tissue culture, gene editing, and phenotyping approaches. I also contribute to institutional governance through roles in hiring committees, scientific coordination, and research facility management.

Overall, my curriculum demonstrates an independent scientific trajectory, a strong and consistent publication record, leadership in multidisciplinary research, and a distinctive profile bridging fundamental plant biology with applied bioengineering. This places me in a strong position to develop an internationally competitive research programme in Spain focused on the rapid domestication of wild plants and the creation of resilient, nutritious crops for future food systems.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: PIEDRAFITA FERNANDEZ, GABRIEL
Referencia: RYC2025-056468-I
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Título: Cell competition and clonal dynamics in normal and precancerous epithelial tissues

Resumen de la Memoria:

I am a systems biologist with a mixed experimental and computational experience, interested in understanding basic quantitative principles in cell biology, related with cellular dynamics, competition and control in homeostasis and disease. This is an exciting, emerging, interdisciplinary matter that motivates my independent lab's research line and that I also enjoy teaching as Associate Professor in Computational Systems Biology.

After an early research career developed within the field of the origin of cellular life, first as a FPU fellow during my PhD and later as a Postdoc (funded by a ERC Starting Grant, University of Cambridge), which allowed me to gain complementary experimental and computational modelling skills, my trajectory has been centered in understanding clonal dynamics in normal and precancerous tissues. Epithelia are among the simplest, most homogeneous mammalian tissues. Yet, little is known on how epithelial cells preserve tissue homeostasis. In 2016 I joined Jones' group at the Sanger Institute as a Quantitative Biologist to focus on the quickly self-renewing tissues of skin epidermis and esophagus, complementing my experimental colleagues' approaches with my modelling skills. By means of quantitative lineage tracing data, a technique that allows tracking clonal cell populations over time in transgenic mice, and mathematical models, I was able to resolve the paradigm of proliferation of WT keratinocytes (Piedrafita et al, 2020, Nat Commun), helped determining the basis of growth of certain neoplastic mutant clones (Murai et al, 2018, Cell Stem Cell), and leveraged this quantitative understanding to propose mechanisms for rational intervention (Fernández-Antorán et al, 2019, Cell Stem Cell). I crystalized these ideas in a model of mutant cell competition that explains clone behavior in poly-mutated tissue and is the driving force in (Colom et al, 2020, Nat Genet) publication.

Back to Spain, with a CAM Talento fellowship to work between the Epithelial Carcinogenesis Group and the Bioinformatics Unit at CNIO, I extended my attention to slow-renewing tissues, and in particular the bladder urothelium, for being extremely quiescent and reluctant to clonal dynamics studies, despite showing highly regenerative responses upon injury and a high impact in cancer. In Dec 2021 I was appointed as Associate Professor at UCM, where I lead the Biophysics & Systems Biology group. Since then, I have been developing projects (granted by Plan Estatal 2020 and later Plan Estatal 2023) to conduct experimental lineage tracing studies and genomic analyses in mouse urothelium, aimed at addressing cell competition constraints to bladder carcinogenesis and exploring the impact of regeneration in transformation. I'm supervising two PhD students, while I keep collaborations in mutant dynamics studies in both esophagus and bladder (Colom et al, 2021, Nature; Abby et al, 2023, Nat Genet; Herms et al, 2024, Nat Genet; see also Collaboration grants).

Resumen del Currículum Vitae:

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Turno General

Área Temática: Biociencias y biotecnología
Nombre: DOMÍNGUEZ HUERTA, GUILLERMO
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Título: VIRUS BIOINFORMATICS

Resumen de la Memoria:

My research career is driven by a central question: how do viruses that infect microbes shape the functioning of the living world? Viruses are the most abundant biological entities on Earth, key engines of gene exchange, metabolic innovation, and ecosystem regulation. Yet most of their genetic diversity remains uncharacterized. This unresolved virosphere “dark matter” has guided my scientific trajectory across different systems, technologies, and conceptual frameworks.

I was initially trained in classical virology and virus evolution, studying how mutation, selection, and host context shape viral diversity. This early work established the foundation for my later transition toward environmental virology and large-scale ‘omics approaches. In the following years, I became deeply involved in the metagenomic and metatranscriptomic exploration of natural virus communities, especially in marine environments. Working within global initiatives such as the Tara consortium, I helped develop and apply computational strategies that revealed unprecedented virus diversity, uncovered their ecological distributions and metabolic impacts. These findings contributed to a broader “virocentric” view of life, highlighting viruses as fundamental evolutionary forces and ecosystem engineers.

My current research extends this framework to coastal ecosystems undergoing strong human pressures. Using temporal and comparative metagenomics, I investigate how prokaryotic and eukaryotic viruses interact with nutrient enrichment, environmental shifts, and biogeochemical cycling in the Mar Menor lagoon. This system provides a natural “laboratory” to examine how virus features respond to environmental disruptions. At the same time, it offers a unique opportunity to identify viral traits with practical applications.

Building on this integrative background with strong emphasis on virus bioinformatics, my proposed line of research aims to unlock the enormous biotechnological potential of viruses infecting microbes. I focus on three pillars: (i) genome-resolved catalogs of DNA and RNA viruses across diverse microbiomes; (ii) functional prediction of virus-encoded proteins of unknown function using deep learning that integrates sequence, 3D structure, and protein-protein interaction; and (iii) experimental isolation and testing of viruses with desirable properties, including host specificity, metabolic modulation, and enzymatic novelty. This approach seeks to convert our understanding of microbial viruses into actionable knowledge for biotechnology (e.g., genetic engineering, therapeutics, industrial production, biocontrol).

Resumen del Currículum Vitae:

I am an internationally connected virologist with strong computational expertise and over eight years of experience studying viruses that infect environmental microbes. My work spans virus evolution, metagenomics, and ecology, integrating conceptual, methodological, and technical advances while demonstrating independence, leadership, and a sustained ability to drive multidisciplinary research.

My early training combined classical virology and evolutionary biology. During my Advanced Studies Diploma, I helped establish in vivo systems to study lethal mutagenesis in tobacco mosaic virus. I earned my PhD in 2016, supported by a competitive CSIC-JAE fellowship, focusing on the intra-host evolution of begomoviruses responsible for tomato yellow leaf curl disease.

In 2017, I joined the Sullivan Lab at The Ohio State University first as a Ramón-Areces fellow and later as an NSF-funded postdoctoral researcher. There, I led the research program on the global ocean RNA virome. I implemented and benchmarked computational pipelines that enabled the discovery of multiple emergent RNA virus megataxa, including novel phyla, and revealed their ecological patterns, predicted hosts, and metabolic capabilities. This work transformed the field by shifting ocean viromics beyond the traditional DNA-virus focus and uncovering auxiliary metabolic genes in RNA viruses for the first time. I coordinated a team of postdocs and PhD students, contributed to widely used software tools (VirSorter2, Cenote-Taker 2), or helped pioneer the use of Hi-C sequencing for virus-host linkage inference.

During 2021-2023, I continued my collaboration with the Sullivan Lab as a remote scientific consultant. I led research on RNA virus ecogenomics in permafrost, contributed to studies on AMGs, mobile genetic elements, and applied high-fidelity long-read sequencing technologies to environmental RNA viruses. I was invited to co-organize the 1st RdRp Summit and chaired the Early-Career Viromics webinar series, reflecting my active role in community building and scientific dissemination.

Since 2023, I have been the sole virus expert in the EPRA group at the Oceanographic Center of Málaga (IEO-CSIC), funded through the BELICH project. I established independent research lines on bacterioplankton-infecting viruses in the eutrophic Mar Menor lagoon, producing the first comprehensive temporal and comparative viromic analysis for this ecosystem. I have developed collaborations with national and international partners and secured competitive funding as principal investigator (PADI Foundation, 2024) to study virus-mediated processes in the invasion of the macroalga *Rugulopteryx okamurae*. I also mentor graduate students, including the supervision of a Master’s project on biotechnological applications of marine AMGs.

Overall, I have made substantial contributions to virology, pioneered approaches for dissecting environmental RNA and DNA viromes, and built a robust global collaborative network. My trajectory reflects consistent leadership, innovation, mentorship, and the capacity to develop new research directions within interdisciplinary teams.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: MARTÍNEZ LÓPEZ, ALICIA
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Título: Immunology and Molecular mechanism of disease

Resumen de la Memoria:

Immunology and Virology have always been my focus of interest and my passion. In 2009 I got a FPI grant that allow me to become an official member of the Antiviral Strategies group led by Dr. María Amparo Estepa at the Instituto de Investigación, Desarrollo e Innovación en Biotecnología Sanitaria de Elche (IDIbE) at Miguel Hernandez University. During my PhD, I developed powerful tools in the aquaculture industry like the Recombinant vaccine against the Viral Hemorrhagic Septicemia Virus (VHSV) (WO 2015/025068 AI). We identified, for the first time, the two major determinants of the glycoprotein G of the VHSV implicated in triggering the host type I IFN antiviral response and its possible use as DNA molecular adjuvants. Moreover, I also studied the possible therapeutic applications of the Myticin-C antimicrobial peptide in the activation of the cellular regeneration and tissue reparation after an injury (Ref.:2763349) and its applications as a suitable template for the development of antimicrobial agents (Marine Drugs). I had the opportunity to present my investigations at international conferences, and to build collaborations that helped me to get grants to stay 3 months at the University of Penn (USA), and 3 months at the University of Wageningen (The Netherlands). In 2014 I obtained my PhD. I stayed in Dr. Estepa's lab for another year (2015) as a postdoc to finish on-going studies and directing a Masters Thesis that was awarded with Honors qualification, which study helped to better define the so-called trained immunity and its importance in lower vertebrates (Frontiers in Immunology). Another of my important contributions to the understanding of the viral clearance mechanisms of lower vertebrates was the study of the role of TNF α during a viral infection (Plos Pathogens). In 2016 I got a postdoctoral position at the Albert Einstein College of Medicine in New York (2016-2020). Here I got involved in a project focused on understanding the role of SAMHD1 in the development of Aicardi-Goutieres syndrome (AGS), a Type I Interferonopathy, and I characterized in detail the implication of the loss of function of SAMHD1 in these patients, results of high relevance to the biomedicine as we proposed the use of a small-molecule to treat patients with early-stage AGS (Molecular Immunology and Human Mutation). Additionally, I participated in a project studying the receptor interaction of Zika Virus and the design of drugs that restrict its infection (EbioMedicine and Virology). My postdoctoral stay allowed me to establish international collaborations that remain active until the present day. Currently I am hired as a Miguel Servet researcher in the group of Immunology, Inflammation and Cancer at the Instituto Murciano de Investigación Biosanitaria (IMIB). Due to my extensive experience in the immunology field, my main project is now directed to the characterization of Type I Interferonopathies using the zebrafish animal model, and its use for the search of new treatments. I have been granted with a research grant as PI to develop models of KBG syndrome. In addition, I have also obtained a grant as a Coordinator-PI to study treatments against congenital anemias. All my investigations have been of high clinical relevance, as they are all directed to elucidate pathological mechanisms and possible therapeutic targets.

Resumen del Currículum Vitae:

In July 2014 I completed my PhD under the supervision of Dr. María Amparo Estepa Pérez in the University Miguel Hernández of Elche. My thesis titled -Nueva generación de vacunas DNA frente a Rhabdovirus de peces- received the Cum Laude and International Mention distinctions. The results obtained during my stay at Dr. Estepa's lab gave me 20 publications (first author in 7), 19 contributions to conferences, the VIII Jacumar Prize to the aquaculture investigation, and two patents, one of them international. During my PhD I had the opportunity to start forming a strong international network of collaborations, as I was awarded with two international grants to stay in the University of Penn (USA) and in the University of Wageningen (The Netherlands). In addition, I co-directed a Master Thesis that was later published in Frontiers in Immunology. In January 2016 I got a postdoctoral position at the Albert Einstein College of Medicine in New York that lasted 4,5 years. The long stay at Albert Einstein gave me the necessary training and strategies to grow independently and in a highly competitive environment. It also implied a quantitative and qualitative change in my CV and career, as it allowed me to get 8 scientific papers, mentor several internal students and to establish permanent international collaborations. In January 2021, I came back to Spain and I started working as a senior postdoctoral researcher in the group of Immunology, Inflammation and Cancer led by Dr. Mulero. Here I started the development of zebrafish avatars for the creation of preclinical models for Type I Interferonopathies and SARS-CoV-2 that will allow to do high throughput drug screening for these diseases. The study is so promising that I was awarded with the Best Oral Communication Prize for our research in the Zebrafish Type I Interferonopathy models in the "VI Jornadas Científicas IMIB-Arrixaca 2021", and I have recently published two papers as first and corresponding author related to this project. I have my first research grant as PI to develop models of KBG syndrome, and a grant as Coordinator-PI to study treatments against congenital anemias, proving my scientific maturity and the ability to work and think independently. I have also obtained the R3 certificate in 2024 and I have been selected for a Miguel Servet grant. Summarizing, I have published 38 peer-reviewed papers and 1 Book chapter (H-index=19, 1st author in 15, corresponding in 4). I have three patents, participated in 9 projects, IP in two. I attended to 15 conferences. I have been the director of two Master's Thesis and one End of Degree Project, supervised rotation students at Albert Einstein and I am currently co-directing one Master's Thesis and two PhD students. I have also participated as a scientific committee in the European Commission, as a committee for End of Degree Projects and for a Thesis Defenses. Moreover, I have participated in the university scientific dissemination activities. I actively collaborate as a reviewer for SCI journals. The Ramon y Cajal grant would be decisive to achieve the long-term career goal at becoming an independent investigator, compete in international grant programs such as the ERC Consolidator, transfer my knowledge, train the next generations, and keep on putting my grains of sand into science.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biociencias y biotecnología
Nombre: SANTANA MOLINA, CARLOS
Referencia: RYC2025-056298-I
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Título: Postdoc

Resumen de la Memoria:

My research career has focused on the molecular evolution of biological systems, specifically biosynthetic pathways and protein complexes, using computational approaches such as phylogenetic and comparative genomic analyses. I did my PhD with Damien Devos at CABD-UPO, and I investigated about the evolution of sterol biosynthesis in prokaryotes, the evolution of CATCHR complexes involved in the endomembrane-system of eukaryotes, and the evolution of FtsZ/Tubulin proteins which is involved in cell division and cytoskeleton. Apart from this, I was involved in 3 international collaborations that have addressed diverse topics, and conceived a SIAM talent grant for doing an internship in Radboud University (Nijmegen, Netherlands). During this period, I also published an article about the evolution of carotenoids which was awarded as best scientific article of CABD in 2020-2021. I did my postdoc with Anja Spang and Berend Snel at NIOZ (Netherlands) to investigate the evolutionary origins of central carbon metabolism in eukaryotes. I am currently working in large-scale analyses that addresses the evolutionary origins of all eukaryotic metabolisms (in preparation). Altogether, during my research trajectory I have gained a profound expertise in project development, technical approaches in molecular evolution, knowledge about the diversity and evolution of the Tree of Life (especially in eukaryogenesis), as well as obtained a wide international collaborative network.

In my project proposal, I will investigate the molecular mechanisms and impact of endosymbiotic parasitism during the origin and evolution of eukaryotes. This proposal consists of three major aims that are related with each other. First, I aim to investigate a potential convergent evolution of Chlamydia and Dependenteiae bacterial parasites. In my current work, we found that these bacteria have exchanged genes among them and with eukaryotes, which points to an evolutionary event that might explain the origin of certain eukaryotic parasitism in the context of eukaryogenesis. Second, I aim to investigate the gene exchange of other bacterial parasites with eukaryotes. This will put into context the phenomenon of Chlamydia and Dependenteiae, as well as it will provide an overview for the diverse strategies in bacteria to better understand the emergence of eukaryotic parasitism and the impact of these during eukaryotic evolution. Finally, I aim to investigate the relative timing of prokaryotic interactions during eukaryogenesis by doing phylogenomics of the eukaryotic tree of life with alternative prokaryotic roots (including Asgardarchaea, Alphaproteobacteria, Chlamydia/Dependenteiae and Myxococcota outgroups) in which the eukaryotic stem branch-length will be used as a proxy for the relative timing. This in turn, will provide crucial information about the position of the eukaryotic root. Although investigating eukaryotic parasitism is relatively novel for my experience, the extensive bibliography, my deep knowledge about the taxonomic diversity of prokaryotes and eukaryotes as well as my expertise in molecular evolution and eukaryogenesis, makes this project feasible for me. Altogether, this proposal will have impact in different fields such as eukaryogenesis, eukaryotic evolution and the origin and evolution of bacterial pathogenicity which is of important medical interest.

Resumen del Currículum Vitae:

I obtained my bachelor in Biology in 2015 in the University of Sevilla where I defined my interest for the field of molecular biology and started get interest for bioinformatics doing a training course outside of the university. I did my bachelor's thesis with Andrés Aguilera as mentor (CABIMER-US) about "Molecular Basis of Chromosome Fragility", in which I learned to identify gaps of knowledge in a specific field and project development.

Then, in 2017 I obtained my Master in "Molecular Genetics and Biotechnology" at the University of Sevilla doing the internship with Damien Devos (CABD-CSIC) who introduced me to the field of molecular evolution from a computational point of view. The Master's thesis was about the "Evolution of Sterol Biosynthesis in Prokaryotes" which triggered my fascination for understanding the origin of eukaryotes and that later became into the main topic of my PhD. After the Master, I did an internship with Mark Field (University of Dundee, Scotland), where I worked on the genome of the *Euglena gracilis*, and obtained my first publication as coauthor.

In 2018, I started my PhD with Damien Devos focused on the evolution of molecular systems in the context of the Tree of Life. We started investigating the evolution of sterol biosynthesis (Santana-Molina et. al 2020, MBE), the evolution of eukaryotic protein complexes involved in the eukaryotic endomembrane system (Santana-Molina et. al 2021, GBE), and the evolution of the FtsZ/Tubulin protein family (Santana-Molina et. al 2023, Front Microbiol). In addition, the project about the evolution of sterol led to an important hypothesis that connected the biosynthesis of sterol with carotenoid production through the squalene precursor, which was confirmed through experimental analyses in the lab (Santana-Molina et. al 2022, PNAS). Together, these publications in which I was first and corresponding author, were decisive to acquire my knowledge about experimental development, the evolution of the tree of life, as well as my scientific criticism and project conceptualization. In addition, I participated in 4 publications as coauthor, including international collaborations.

In 2021, I started the postdoc in NIOZ (Netherlands) together with Anja Spang (NIOZ-UvA) and Berend Snel (University of Utrecht), who are leading experts in the field of the origin of eukaryotes. I performed a comparative genomic investigation about the "Origin of the Central Carbon Metabolism of Eukaryotes" (Santana-Molina et. al 2025, Nat Ecol Evol). We are currently working on the final stages of a large-scale analysis that addresses the "Origins of Eukaryotic Metabolisms" which opens new research lines that consolidate the basis of my proposal. These 4 years of postdoc, have considerably refined my methodological and conceptual skills as well as extended my scientific collaborative network. During this period I did a course of ETE for analyzing phylogenetic trees programmatically.

Apart from the publications (11 papers in total, 5 as first author), I have participated in 6 international congresses including 5 talks. I have been involved in peer review from journals such as Nat. Struct. Mol. Biol, Cell Reports, and GBE. In addition, I have been actively involved in bioinformatic workshops in NIOZ, and I have mentored students since my PhD, including the co-supervision of Master and PhD students.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: BEEKMAN, RENÉE
Referencia: RYC2025-055043-I
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Título: Single Cell Epigenomics and Cancer Development

Resumen de la Memoria:

As MSc and PhD student (Erasmus University, Rotterdam, The Netherlands) and postdoc (IDIBAPS, Barcelona, Spain), I became acquainted with the study of genetics and epigenetics in hematological malignancies. At present, in my lab at CRG, Barcelona, Spain, we implement single-cell, single-molecule and genome editing tools to study epigenetic processes in normal B-cell development and lymphoma formation, as outlined below.

We developed scTAM-seq, filling a gap in the single-cell field, allowing analysis of DNA methylation of ~700 target sites in ~10,000 cells with very low dropouts rates compared to other methods (Bianchi & Scherer et al, Genome Biology, 2022). We have outlined its opportunities in a perspective article (Albinati & Bianchi et al, Front Mol Biosci, 2023). The power of this method can be further appreciated from its use to study clonal dynamics of blood aging (Scherer et al, Nature 2025). And, we have used scTAM-seq to uncover lymphoma-related DNA methylation fingerprints in healthy tissues, representing rare cell healthy subtypes at the root of tumor formation (Bianchi and Albinati et al, submitted). In addition, we showed that bulk DNA methylation patterns in tumors give insights into putative genome activation histories along lymphomagenesis, differentiating transcription factor programs in the cell subtype of origin, early tumor formation and full-blown tumors (Albinati et al, NAR Genomics and Bioinformatics). My follow-up research lines focus on a deep characterization of the cell of origin of MCL through surface marker, genome-wide transcriptome and simultaneous DNA methylation profiling. And, on defining the generalizability of our findings in other tumors. In this context, we have established multiple collaborations to study other B-cell malignancies using scTAM-seq.

We moreover have defined a new long-range genome interaction phenomenon, underlying the upregulation of genes spanning entire chromosome arms upon formation of lymphoma-associated translocations. We furthermore highlight that this phenomenon depends on the activity state of the genes on the affected chromosome arms prior to translocations, as only active genes show enhanced expression (Oncins et al, NAR 2025). This phenomenon sheds light on early lymphoma formation and could explain why lymphoma-associated translocations can be found in healthy individuals without having an oncogenic impact; the activity state of the affected chromosome in these cells in healthy individuals may not favour oncogenic long-range gene regulatory effects. We have outlined the role of the epigenome and translocation-induced effects in greater detail in a recent review (Oncins et al, Med Res Arch 2024). My follow-up research lines focus on studying the functional role of gene expression enhancement in lymphoma formation, using CRISPR knockout and validation studies to understand the contribution of the genes with enhanced expression levels to oncogenic characteristics such as proliferation and migration.

Finally, we are delving into underexplored aspects of DNA methylation to further understand and/or uncover new gene regulatory phenomena. Altogether, we thus implement and build new tools to resolve hidden temporal processes linking features such as cell subtype diversity, early tumor formation and gene regulation, with clear relevance for understanding health and disease.

Resumen del Currículum Vitae:

I obtained my MD and MSc Degree in Molecule Medicine at the Erasmus University, the Netherlands. As PhD student at the same university, I defined (epi)genetic lesions in acute myeloid leukemia, leading to nine publications (including three first authorships in Blood, PLoSOne and Haematologica). Next, I performed a postdoc in IDIBAPS, Spain, with independent funding covering my salary (Dutch Rubicon Fellowship 2013-2014, Marie Curie Intra European Fellowship 2014-2016, and Lady Tata Memorial Trust International Award 2016-2017). During this time, I became acquainted with genome-wide epigenetic and 3D chromatin structure characterization of normal and malignant B cells, leading to 18 publications (including three first authorships in Cancer Cell, Nature Medicine and Nature Communications).

Heading towards independence in IDIBAPS, I obtained independent funding (La Caixa Junior Leader Fellowship 2018-2021, Proyectos de I+D+i RETOS INVESTIGACIÓN 2019-2022 and European Hematology Association Advanced Research Grant 2020-2022), while still finishing my postdoctoral work. Since 2020, I lead the Single Cell Epigenomics and Cancer Development lab as independent PI at CRG, Spain. In my lab I use single-cell, single-molecule and genome-editing tools to study epigenetic processes during normal B-cell development and early lymphoma formation. Two years later, I obtained further funding (ERC Starting grant 2022-2027, and Proyectos de Generación de Conocimiento 2022-2025).

My group consists of one lab manager, one research technician, three PhD students, and three postdocs. Furthermore, two PhD students finished recently (both with Excellent Cum Laude, one with additional International Mention). And I hosted nine summer/master/postgraduate students (two of them were MDs). All my lab members receive training in gene regulation, single-cell and single-molecule methods, CRISPR-Cas9 based genome editing, and normal and neoplastic B-cell differentiation. They also get opportunities to apply for fellowships - so far, all my five PhD students and three postdocs have received independent funding. As a team, we have published three research articles in Genome Biology (2022), NAR (2025) and NAR Genomics and Bioinformatics (2025) so far, with an additional research article submitted, and another in preparation. Furthermore, we published four reviews/perspective/commentaries. Moreover, I contribute to training many young researchers by being a member of thesis advisory committees (15x) and defense tribunals (12x national, 2x international), and a mentor in four mentorship programs (BIST, EU-LIFE, CRG and EHA).

Finally, I participated in many outreach activities by (i) interviews for regional and national news, (ii) lectures for primary schoolchildren and high school students, and (iii) a video on sex and gender dimension in research for the International Day of Women and Girls in Science.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Título: Uncovering metabolic and stress signals controlling T cell immunity

Resumen de la Memoria:

Throughout my scientific career, my research has focused on uncovering the molecular and metabolic determinants that regulate T cell fate and function. During my PhD in the laboratory of Prof. Sánchez-Madrid at the Centro Nacional de Investigaciones Cardiovasculares (CNIC), Madrid, I pioneered a research line aimed at investigating the role of mitochondria in T cell activation. We found that mitochondria position toward the immune synapse (IS) is critical for T cell receptor (TCR) clustering and downstream signaling (Baixauli et al., EMBO 2011). Moreover, during my PhD I was also involved in various projects aimed at understanding the role of exosomes in immune cognate interactions. In a perspective article, we suggested that exosome secretion and autophagy function as quality control mechanism to maintain intracellular homeostasis (Baixauli et al., Frontiers in Immunology 2014). Consistent with this notion, we found that exosomes transfer mitochondrial proteins and mtDNA from T cells to antigen-presenting cells during immune interactions, activating the cGAS/STING pathway (Torralba, Baixauli et al., Nature Communications 2018).

Under the guidance of my PhD co-supervisor, Dr. Maria Mittelbrunn, we generated a mouse model for investigating mitochondrial function in T cells by deleting the mitochondrial transcription factor A (TFAM) in T cells. We found that mitochondrial dysfunction impairs lysosomal calcium and degradative capacity, leading to sphingomyelin accumulation and autophagy defects, and skewing naïve T cells toward inflammatory phenotypes (Baixauli et al., Cell Metabolism 2015). Motivated by understanding the systemic implications of immune dysfunction, we investigated how mitochondrial dysfunction in T cells influences organism homeostasis and found that TFAM-deficient T cells exhibit hallmarks of T cell aging, including disrupted proteostasis, reduced plasticity, and increased senescence. These defects induced systemic low-grade inflammation (inflammaging) and accelerated the onset of age-associated diseases. We demonstrated that dysfunctional T cells triggered paracrine senescence in distant organs, highlighting their role in tissue senescence and aging (Desdin-Mico et al., Science 2020, co-senior author).

In 2017, I joined for my postdoc the laboratory of Dr. Erika Pearce at the Max Planck Institute for Immunobiology and Epigenetics (Freiburg, Germany) to investigate how mitochondrial membrane remodeling regulates T cell function. My work uncovered a mitochondria-tumor suppressor axis that limits Th17 pathogenicity (Baixauli et al., Nature 2022). We found that Th17 cells rely on the mitochondrial fusion protein OPA1 for its role in TCA cycle metabolism. OPA1 deficiency increased glutamine oxidation and 2-hydroxyglutarate accumulation, disrupting chromatin organization and reducing IL-17A expression. Through multi-omics analyses, we identified LKB1 as a key mediator of the metabolic rewiring in OPA1-deficient cells; its deletion restored cytokine production by correcting glutamine flux and chromatin defects.

In 2022, I started as a Project leader at the Department of Biomedicine, funded by an Ambizione Grant from the Swiss National Science Foundation (SNSF), where I study the role of serine metabolism in controlling pathogenic and non-pathogenic Th17 responses.

Resumen del Currículum Vitae:

During my studies in Biochemistry and Molecular Biology at the University of Valencia (Spain), I discovered my passion for science and research. During my PhD in the laboratory of Prof. Francisco Sanchez-Madrid, I was a member of a pioneer group working on molecular immunology in one of the most prestigious research institutes in my country, the National Center for Cardiovascular Research (CNIC, Madrid, Spain). I acquired a set of valuable technical, theoretical and mentoring skills that led to several prestigious publications in the fields of immunometabolism and mitochondrial biology. For my postdoctoral training, I moved to Freiburg, Germany, to work at the Max Planck Institute for Immunobiology and Epigenetics in the laboratory of the Max Planck director Prof. Dr. Erika L. Pearce. My postdoctoral period represented a key stage in my early research career. First, my work was funded by two prestigious agencies: the Alexander von Humboldt Foundation from Germany and the Marie Skłodowska-Curie Actions of the European Commission. Second, my project immersed me in a highly interdisciplinary and collaborative research environment that expanded my theoretical and methodological knowledge, and allowed me to address important biological questions about how metabolism controls immune cell function, from basic molecular mechanisms to in vivo models. My extensive postgraduate, and postdoctoral training has prepared me well to now move towards establishing my own line of research and academic independence. My current position as project leader at the Department of Biomedicine of the University of Basel (funded by an Ambizione grant from the Swiss National Science Foundation) is driving my ambition to now start the process that will take me to the next level, and lead a research laboratory aimed at understanding how metabolism is interlinked with immune cell decisions during disease and aging.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Referencia: RYC2025-055294-I
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Título: Mitochondrial Biology and Tissue Regeneration

Resumen de la Memoria:

I am a Junior Group Leader at Institute for Research in Biomedicine (IRB Barcelona, Ageing and Metabolism Programme), where I established the Mitochondrial Biology and Tissue Regeneration Lab in May 2024. My long-term objective is to understand how mitochondrial genetic variability and mitochondrial quality control shape immune function and tissue resilience, particularly in ageing and mitochondrial disease contexts.

I have always been interested in mitochondria's dual role as energy powerhouses and key players in cellular signalling and pathophysiology. During my PhD (FPI-Severo Ocha, International Mention), I investigated nucleo-mitochondrial crosstalk and how mitochondrial genetics modulates electron transport chain plasticity and organismal physiology, with contributions spanning mouse and human studies. I then expanded into tissue biology, defining how mitochondrial heterogeneity influences cardio-pulmonary function during ageing and contributes to mitochondrial disease phenotypes, and contributing to mechanistic work on mitochondrial quality control in heart failure models.

My postdoctoral training at the University of Oxford and Berlin (FAME postdoctoral Fellowship, EMBO postdoctoral Fellowship) further specialised my profile in immunometabolism and mitochondrial quality control. I led a project that connected mitochondrial ROS signalling to anti-tumour adaptive immunity and checkpoint biology,. Additionally, I demonstrated for first time mitochondrial transfer from cardiomyocytes to cardiac macrophages for degradation and defined the importance of selective organelle removal and cytoplasmic clearance in long-lived immune populations and differentiation programmes. I have served as co-PI on translational, human sample-based studies in mitochondrial disease in close collaboration with clinical teams in the NHS (UK), and on a Collaborative Research Centre project at Charité-Universitätsmedizin Berlin investigating post-operative delirium. In 2022, I launched an immunometabolism programme at the University of Oxford, studying vaccination responses and developing T-cell immunomodulation strategies by enhancing mitochondrial clearance in mouse models and patients with mitochondrial disease. In parallel, a partnership with Minovia Therapeutics supported the development of mitochondrial augmentation strategies in stem cells.

My research trajectory has evolved from defining the subcellular mechanisms that preserve mitochondrial integrity to understanding how these processes shape cellular and tissue function, including intercellular communication. This progression has taken an increasingly translational direction, strengthened by my part-time clinical training within the NHS Mitochondrial Disease Service. I now lead a team developing cellular-therapy-oriented strategies to rejuvenate T cells and protect energetically demanding tissues by improving mitochondrial fitness in immune cells. We combine advanced flow cytometry, functional mitochondrial profiling, imaging, and multi-omic approaches to dissect how mitochondrial states are established, sensed, and propagated across cells and tissues, with the long-term goal of enabling mitochondrial-based interventions and cellular therapies to restore immune resilience and support healthy ageing.

Resumen del Currículum Vitae:

I am a mitochondrial biologist and immunometabolism researcher currently serving as Junior Group Leader at IRB Barcelona (since May 2024). I have held research positions across Spain (CNIC), the UK (University of Oxford; WIMM and Kennedy Institute), and Germany (Charité-Berlin), supported by competitive postdoctoral fellowships including EMBO, FAME, and La Caixa Incoming JL.

My research outputs include 45 manuscripts (39 published; Citations: 3196; h-index: 21; 6 under revision), with first and corresponding authorship across high-impact journals, including Cell, Nature, Nature Cell Biology, Circulation, and Cell Metabolism. My work has advanced understanding of (i) nucleo-mitochondrial interactions in physiology, (ii) mitochondrial heterogeneity in ageing and mitochondrial disease phenotypes, (iii) mitochondrial ROS signalling in anti-tumour immunity and immunotherapy responsiveness, and (iv) mitochondrial quality control and intercellular organelle handling in long-lived cells. I have also authored and directed authoritative reviews, including invited viewpoints, reflecting independent scientific thinking and leadership in emerging topics.

I have secured and led competitive national and international funding as PI and co-PI (over €2.2M), including the FEBS (2025), Spanish Research Agency Grant "Proyectos de Generación del Conocimiento" (2024), La Caixa Junior Leader (2024), Ramón Areces (2024), ASEICA-FDM (2024), UMDf (2024), and the EMBO LTF (2021). I have supervised 27 undergraduate/MSc, 5 PhD students, 6 research staff, and 4 postdocs, and maintain 25+ collaborations with over a dozen internationally recognised institutions. I am actively engaged in translational and innovation-driven initiatives (ie. i4KIDS Innovation Hub) and competitive programmes such as ATMP Catalyst 2025 and AgeMMetTECH (AEI-2025). I have delivered 25+ invited talks, organised national and international conferences, and regularly act as a reviewer for leading journals and as an evaluator for competitive funding bodies.

I am an active member of several international networks (EHA, BSI, EACR, ASEICA, SEBBM, CARINA) and engage in public outreach via Oxford Sparks, European Researchers' Night, Crazy about Biomedicine and The Scientist (2022). I promote inclusive science through WIA, and EDI initiatives. I also contributed to teaching at the University of Oxford and the Barcelona Institute of Science and Technology. My dedication to research ethics is reflected in certifications in Research Integrity (Oxford University Press), Scientific Writing (EMBO,2023) and Laboratory Leadership (EMBO,2021) and open science practices.

My work has earned multiple recognitions, including: FEBS Excellence Award (2025), "Yo, Jefa" role model (2024), FEBS YTF Award (2022), María Teresa Miras SEBBM Award (2021), Molecular Oncology Prize (2021), Constantes y Vitales Award (2020), Doctoral Extraordinary Award (2019), Summa Cum



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Laude PhD with International Mention (2018), Top 30 Women Under 30 by Mujer Hoy (2018), and the Junta de Andalucía's Most Influential Young People Award (2016). These honours underscore the scientific and societal impact of my career, and, together with my international experience, publication record, competitive funding, and established collaborations, position me to consolidate an ambitious independent research programme within Spanish biomedical research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Título: Decoding Brain Energy Dynamics: From Cancer Metabolism to Neurodegenerative Disease

Resumen de la Memoria:

Mi trayectoria científica ha estado siempre guiada por una pregunta común: entender cómo el metabolismo condiciona la función neuronal y cómo su desregulación contribuye al inicio y progresión de la enfermedad. Me formé en Biotecnología y realicé un doctorado en Biología Molecular, donde adquirí una base sólida en genética, bioquímica y fisiología celular. Tras la tesis, me trasladé a Francia, donde durante los últimos seis años he desarrollado mi carrera postdoctoral de manera plenamente internacional, primero en el ESPCI París y, en paralelo, a través de colaboraciones estables con el Institut Pasteur.

En el laboratorio Energy & Memory del ESPCI tuve la oportunidad de trabajar con un grado de libertad excepcional. Esta autonomía me permitió crecer como investigadora independiente, diseñando mis propios experimentos, impulsando mis propias preguntas y supervisando estudiantes de grado y máster. Gracias a este entorno, consolidé una línea de investigación centrada en la comunicación metabólica entre neuronas y células gliales y en su papel en la homeostasis cerebral. Durante este periodo me especialicé en modelos de *Drosophila*, biosensores metabólicos, microscopía multifotónica y análisis funcional in vivo.

En paralelo, inicié una colaboración continuada con el Institut Pasteur que derivó en la creación de un pequeño subgrupo de investigación que colidero. En este contexto, estudiamos la regulación epigenética y metabólica en hepatoblastoma y medulloblastoma utilizando enfoques bioinformáticos, lo que complementa mi perfil experimental con una visión más integradora y basada en análisis de datos. Esta doble actividad (experimentos en modelos vivos y análisis computacional) ha enriquecido mi capacidad de abordar problemas biológicos complejos desde múltiples ángulos.

Progresivamente, he ido consolidando una línea de investigación personal centrada en comprender cómo la desregulación del metabolismo neuronal contribuye a la vulnerabilidad neuronal en enfermedades neurodegenerativas, en particular en la ataxia de Friedreich. Este campo, poco explorado y con un enorme potencial traslacional, se beneficia de mi experiencia previa en neurobiología, metabolismo, microscopía avanzada y modelos genéticos. Mi aproximación combina la observación directa del metabolismo in vivo con el estudio de células humanas derivadas de pacientes, lo que permite conectar mecanismos fundamentales con su relevancia en la enfermedad.

Con el contrato Ramón y Cajal aspiro a establecer en España un programa de investigación independiente que integre estos enfoques para estudiar cómo las alteraciones del metabolismo neuronal desencadenan ferroptosis y neurodegeneración. Mi objetivo es crear una línea sólida, interdisciplinar y competitiva internacionalmente que contribuya tanto al conocimiento básico como a la identificación de nuevas dianas terapéuticas en enfermedades raras y neurodegenerativas.

Resumen del Currículum Vitae:

Soy biotecnóloga con doctorado en Biología Molecular con mención internacional y más de seis años de experiencia postdoctoral internacional, principalmente en Francia, donde he desarrollado mi investigación en el ESPCI París y en el Institut Pasteur. Mi carrera se centra en la intersección entre metabolismo, neurociencia y mecanismos celulares de enfermedad, integrando modelos in vivo, cultivos celulares humanos, microscopía avanzada y análisis bioinformático.

Mi producción científica refleja una trayectoria constante e independiente. He publicado tres artículos como autora de correspondencia en *Current Oncology*, *Antioxidants* y *Biomedicines*, y ocho artículos como primera autora en revistas de alto prestigio como *Nature* y *Nature Communications*, además de contribuciones como coautora en distintos proyectos. Participo activamente como revisora en varias revistas internacionales y he formado parte de tribunales académicos, incluida la evaluación de tesis doctorales. Esta actividad demuestra mi implicación en la comunidad científica y mi capacidad para valorar críticamente investigación en ámbitos conectados con mi especialidad.

En docencia, he impartido la asignatura de Farmacología en el grado de Medicina durante cuatro años y he colaborado en un máster especializado en dolor. He dirigido estudiantes de grado y máster tanto en España como en Francia, acompañándolos en la planificación experimental, análisis de resultados y redacción de informes. Esta experiencia docente ha reforzado mis habilidades de comunicación, liderazgo y mentoring.

Mi perfil técnico es amplio y versátil. Tengo experiencia en genética y neurobiología de *Drosophila*, cultivo y diferenciación de iPSCs, uso de biosensores metabólicos, imagen in vivo mediante microscopía multifotónica, análisis transcriptómico (bulk y single-cell), herramientas de biología molecular, ensayos metabólicos y análisis computacional. Esta combinación de competencias me ha permitido liderar proyectos que integran datos celulares, moleculares y funcionales, así como establecer puentes entre modelos animales y humanos.

He mantenido colaboraciones internacionales estables y participado en proyectos competitivos en neurociencia, metabolismo y cáncer. Mi trayectoria evidencia independencia científica, capacidad de liderazgo y una evolución natural hacia la consolidación de una línea propia. La oportunidad del programa Ramón y Cajal representa el paso decisivo para trasladar mi investigación a España, formar un grupo competitivo y contribuir al avance biomédico en enfermedades neurodegenerativas y metabólicas.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Título: Gene editing therapies for muscular dystrophy

Resumen de la Memoria:

Skeletal muscle allows us to walk, breathe, and live independently. Muscle is composed predominantly of large, multinucleated muscle fibers that allow contraction and fulfill crucial metabolic functions. It can repair itself after injury thanks to a rare population of muscle stem cells (MuSC). These cells are dormant and become activated to enable repair of muscle fibers that are damaged due to normal wear and tear (i.e. homeostasis) or to orchestrate large scale regeneration in response to severe damage. They often become exhausted in disease, e.g. due to mutations in genes whose malfunction results in continued tissue degeneration, such as those responsible for >50 different types of muscular dystrophy. MuSC exhaustion leads to regenerative failure and ultimately to muscle wasting, loss of mobility, and in severe cases difficulty breathing. I have dedicated my career to advancing regenerative therapies for genetic muscle disorders, which, until recently, lacked any treatment prospects. During my PhD, I corrected dysferlin-deficient muscle progenitor cells by gene transfer using the Sleeping Beauty transposon. Further, I developed a new method for isolating and propagating human MuSC from muscle biopsies, and optimized methods to enhance MuSC engraftment in mice. During my postdoc, I pioneered CRISPR editing of primary MuSC to repair disease-causing mutations and demonstrated the potential of gene-repaired MuSC to regenerate muscle and repopulate the MuSC compartment following transplantation in xenogenic (human-in-mouse) and autologous (mouse-in-mouse) settings. To do this, I established delivery of CRISPR tools using mRNA nucleofection as well as novel cell-penetrating peptide-based nanoparticles for intracellular delivery of gene editing ribonucleoproteins (collaboration with Samir El Andaloussi at Karolinska Institutet). This allowed highly efficient, biocompatible and safe genome editing, even enabling efficient repair of both mutant alleles in MuSC from compound heterozygous patients. These studies resulted in a patent application and laid the foundation for two first-in-human trials that are in advanced preparation. Instrumental for this were also novel humanized mouse models of muscular dystrophy that I generated and characterized. Currently, I am involved in evaluating the impact of gene-editing interventions on MuSC genome integrity for clinical use. Beyond its translational impact, my work has advanced the fundamental understanding of human MuSC biology, heterogeneity and dysfunction in disease using single cell transcriptomics and transplantation experiments. It has also provided new insights into the effects of mutations on mRNA processing as well as protein three-dimensional structure and biophysical properties. My proposed research program for the next five years and beyond tackles current limitations in the translation of gene editing therapies for muscle disease to the clinic by (i) decoding what drives superior regenerative performance in the context of MuSC therapies, with the goal to develop strategies to engineer cells where these properties are enhanced, and (iii) advancing efficient and safe delivery of gene editors directly to muscle. If successful, this work will advance the mechanistic understanding and the technological toolkit to engineer more potent and safer regenerative therapies for muscle wasting.

Resumen del Currículum Vitae:

I obtained my B.Sc. in Biotechnology from the University of León (2009) and my M.Sc. in Biomedicine from the University of Barcelona (2010). In 2011, I moved to Germany to pursue my PhD in the laboratory of Dr. Zsuzsanna Izsvák at the Max-Delbrück Center for Molecular Medicine (MDC Berlin) and graduated summa cum laude from the Freie Universität Berlin in 2015. Since 2016, I have been a postdoctoral researcher in the group of Prof. Simone Spuler at Charité – Universitätsmedizin Berlin.

My research focuses on developing gene and cell therapies for muscular dystrophies, severe genetic muscle-wasting disorders that still lack causative treatments. I have authored 16 publications, including first- and last-author papers in leading journals such as Nat Commun, JCI Insight, Mol Ther Nucleic Acids, J Control Release and EMBO Mol Med (in revision), as well as resource papers in Stem Cell Res. I am corresponding author on six studies and have contributed key second-author work in Nat Commun and J Clin Invest, plus invited commentaries and perspectives in Mol Ther and BIOSpektrum. I pioneered CRISPR engineering of human muscle stem cells for cell replacement therapies and am first inventor on a patent. This work laid the foundation for two first-in-human clinical trials of autologous transplantation of gene-edited muscle stem cells targeting founder mutations in CAPN3 and SGCA, prominently highlighted by Nat Med. These trials are in advanced preparation.

My training and research have been continuously supported by competitive fellowships and grants, from early scholarships (Eurolife, MyoGrad, AFM-Téléthon) to recent independent funding as principal investigator (>1M EUR) to develop gene editing therapies for ANO5-related muscular dystrophy and non-viral in vivo delivery of CRISPR ribonucleoproteins to skeletal muscle.

During my postdoc I have led productive collaborations with top academic groups (Karolinska Institutet, Leiden University, Freie Universität Berlin, MDC Berlin, Berlin Institute of Health at Charité) and with biotech and pharma partners (AmpTec, Merck, Nanion Technologies). I am a long-standing collaborator and member of the scientific advisory board of MyoPax, a spin-off focused on clinical translation of (gene-edited) muscle stem cells.

I regularly review manuscripts for high-impact journals (including Mol Ther, Science and Nat Med) and serve as a grant reviewer for the Prinses Beatrix Spierfonds. I have co-supervised two Ph.D. students (one graduated with summa cum laude from the Freie Universität Berlin and was awarded the Dissertation Prize of the Berlin Scientific Society, and the other is on track to graduate in 2026), and supervised several undergraduate students, two of whom have advanced to Ph.D. programs.

I also have extensive experience in teaching and science communication, including M.Sc.-level teaching at Charité and workshops and outreach activities on gene therapy and genome editing for students, teachers and the general public, alongside media interviews and public events.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Overall, my recent scientific output, translational impact and funding track record demonstrate the momentum and leadership necessary to establish an independent research group. I am eager to bring my expertise and vision to the Regenerative Medicine Program of IDIBELL.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Referencia: RYC2025-054652-I
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Título: Respuestas inmunitarias como biosensores para la predicción de resultados en inmunoterapia

Resumen de la Memoria:

El sistema inmunitario reconoce infecciones, inflamación y efectos terapéuticos, configurando en gran medida la respuesta clínica. Sin embargo, aún no existen herramientas capaces de traducir estos estados inmunitarios en predicciones clínicas fiables. Por ejemplo, en inmunoterapia con immune checkpoint inhibitors, las tasas de respuesta son bajas, la confirmación radiológica puede tardar meses y los biomarcadores sanguíneos actuales en general no permiten anticipar la respuesta al tratamiento. La secuenciación de ARN unicelular (scRNA-seq) ofrece un nivel de resolución sin precedentes, pero todavía falta un marco cuantitativo que describa cómo interactúan los programas génicos y cómo pueden emplearse para predecir trayectorias clínicas.

En trabajos previos desarrollé herramientas computacionales para identificar programas génicos interpretables (Spectra), generé Cytopus como una base de conocimiento experta, clasificadores celulares de referencia y el recurso poblacional Suco (>6 M de células anotadas). Asimismo, demostré que determinados programas génicos individuales se asocian con resultados clínicos y pueden orientar combinaciones inmunoterapéuticas. Sin embargo, estos avances revelaron una pregunta abierta que trasciende mi trabajo previo centrado en mecanismos de resistencia y dianas terapéuticas: ¿Cómo interactúan varios programas inmunitarios para determinar la respuesta a inmunoterapia y cómo convertir esta información en predictores a nivel de paciente?

Mi proyecto Ramón y Cajal desplaza el foco hacia el desarrollo de inmunodiagnósticos predictivos, con el objetivo global de inferir trayectorias terapéuticas a partir de estados inmunitarios unicelulares. Lo abordaré mediante tres objetivos:

- 1) Identificar programas génicos asociados a respuesta, distinguiéndolos de confusores clínicos (p. ej., quimioterapia concomitante), definiendo su regulación genética y epigenética mediante integración de scRNA-seq, accesibilidad cromatínica y variantes alélicas.
- 2) Definir programas multicelulares que representen el estado inmunitario sistémico, combinando la actividad de programas en distintos tipos celulares para generar una lectura integrada a nivel de paciente.
- 3) Desarrollar modelos de machine learning generativos y conscientes de distribución que integren la estructura completa de programas para predecir respuesta, discriminar beneficios inmunes frente a efectos de quimioterapia y mejorar la toma de decisiones tempranas.

Este proyecto establecerá un marco mecanístico y predictivo capaz de traducir estados inmunitarios unicelulares en información diagnóstica aplicable. Al integrar programas génicos, regulación epigenética y modelos computacionales de predicción, permitirá anticipar la respuesta terapéutica antes de la evidencia radiológica. Con el apoyo del contrato Ramón y Cajal, consolidaré una línea estable de inmunodiagnósticos predictivos basados en datos unicelulares, posicionando a España a la vanguardia de la inmunoterapia computacional y la medicina de precisión.

Resumen del Currículum Vitae:

Mi línea de investigación integra oncología, inmunología y biología computacional para elucidar de forma precisa cómo las respuestas inmunitarias sistémicas influyen en el desarrollo del cáncer y en la eficacia terapéutica.

Inicié mi actividad científica durante mis estudios de Medicina en la Universidad de Heidelberg mediante diversas estancias internacionales. En 2016, en la Universidad de Navarra (Pamplona, España), desarrollé modelos tumorales resistentes a radioterapia y analicé su inmunovigilancia. En 2017, en el MD Anderson Cancer Center (Houston, EE. UU.), implementé técnicas de secuenciación de célula única y citometría de masas para por primera vez comparar respuestas inmunitarias en diferentes tipos de tumores e identificar los mecanismos de resistencia primaria a la inmunoterapia (Goswami & Walle Nat Med 2019).

Realicé mi doctorado en el laboratorio de la Dra. Cerwenka, desarrollando xenografts y cultivos 3D para estudiar células Natural Killer (NK), financiado por una beca competitiva. Posteriormente, en el laboratorio de Dr. Peter Huber (German Cancer Research Center (DKFZ)), inicié una línea independiente de investigación en inmunología y bioinformática, que reveló cómo las células NK influyen en los resultados de la radioterapia en un ensayo aleatorizado (Walle Sci Adv 2022).

Como posdoctoral financiado con una beca de 150 000€ en el laboratorio de Dr. Ungerechts (DKFZ), creé programas de inmunología computacional e inmunomonitoring, generando ANTICIPATE uno de los mayores ensayos clínicos prospectivos de inmunomonitoring celular (440 pacientes) de Alemania. Como investigador principal del estudio, adapté mi plataforma durante la pandemia para evaluar la seguridad de la vacunación frente a COVID-19 en pacientes con inmunoterapia (Walle Nat Cancer 2022).

Entre 2020 y 2023, en el laboratorio de Dra. Peifer (MSKCC, Nueva York, EE. UU.), reforcé mi perfil computacional desarrollando Spectra y Cytopus, dos herramientas de código abierto muy utilizadas para el análisis de célula única (>13 000 descargas).

Mi investigación ha generado avances metodológicos y clínicos. ANTICIPATE contribuyó a recomendaciones de seguridad vacunal y recibió el premio AIO Young Scientist (German Cancer Society). Mis estudios traslacionales motivaron estrategias innovadoras basadas en células NK y combinaciones de radioinmunoterapia, y mis herramientas de software permiten análisis reproducibles en entorno académicos e industriales.

He establecido colaboraciones en España, Alemania, Israel y EE. UU., que me permitieron liderar el consorcio SIMMBAP sobre inmunidad sistémica en tumorigénesis pancreática (financiación: 286.330€ mi laboratorio). Actualmente dirijo el grupo de Computational Cancer Biomedicine en IDIBAPS (Barcelona), financiado por una ayuda competitiva de cuatro años de duración (~750.000€).

Tengo amplia experiencia docente y he supervisado 12 tesis doctorales, cuyos estudiantes han obtenido becas, publicaciones y puestos posdoctorales. También reviso artículos para revistas de alto impacto (Nat Med, Nat Neurosci, Cancer Research).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Mi formación como médico, inmunólogo y científico computacional, junto con una sólida red internacional, competencia plena en español y una trayectoria independiente demostrada, me sitúan en una posición óptima para consolidar un programa de investigación traslacional competitivo y de alto impacto en España.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Título: Molecular basis of hepatic and intestinal dysfunction in chronic liver disease

Resumen de la Memoria:

I graduated in Biology at the University of Santiago de Compostela (USC) with the highest marks of the entire promotion and obtained the Extraordinary Award for the Degree in Biology. I started my scientific career in 2016 in the Molecular Medicine and Chronic Diseases Research Center (CiMUS) thanks to an FPU and a Xunta de Galicia Fellowships. My PhD project, supervised by Rubén Nogueiras and Carlos Diéguez, focused on the role of the LPI/GPR55 system in the progression of metabolic dysfunction-associated steatotic liver disease, was defended in 2021. This led to 18 publications in journals of high relevance, being 4 times first or shared first author in Journal of Hepatology in 2021 (IF=30.1) and two times in 2022 (IF=25.7), and Hepatology in 2021 (IF=17.3), 1 time corresponding author in Journal of Hepatology in 2022 (IF=25.7), 4 times second author including Nature Communications in 2021 (IF=17.7) and 2017 (IF=12.4) and other co-authorships such as Gut in 2023 (IF=23.1) and Cell Metabolism in 2023 (IF=27.7). During the PhD, I performed two stays in CIC Biogune (Spain) (2018 and 2019). My thesis was honored *summa cum laude* by the USC and awarded as Best thesis in Endocrinology and Nutrition in Spain 2021 by the Spanish Society of Endocrinology and Nutrition Foundation (FSEEN).

In the 18 months following my PhD defense, I remained in CiMUS gaining independence and experience in cell metabolism in chronic liver diseases, achieving 4 publications, being 3 times first or shared first author and 3 times corresponding author, highlighting Cell Reports Medicine in 2024 (IF=10.6). In 2022, I obtained a Fulbright fellowship to join Bernd Schnabl lab in University of California San Diego (USA) during my postdoctoral stage to decipher the underlying mechanisms of intestinal dysfunction in the development of alcohol-associated liver disease. In this period, I contributed to 8 publications, being 4 times first or shared first author in Journal of Clinical Investigation in 2025 (IF=10.6) and Journal of Hepatology in 2023 (IF=26.8), 2024 (IF=33.0), and 2025 (IF=33.0), 2 times second author in Cell Host & Microbe in 2024 (IF=18.7) and Gut in 2024 (IF=26.2), or other co-authorships including Nature in 2025 (IF=48.5). On funding, I am recipient of the American Liver Foundation 2024 grant funded with \$25K and the data I generated led to the obtention of >\$3.5M, including \$3.2M from NIH, \$260K from Dutch Digestive Foundation, and €143K from I.S. Carlos III.

In summary, I have authored 30 original articles, being 11 times first or shared first author and 4 times corresponding author, with an h-index of 17 and >1,000 citations. My contributions received prestigious awards, including the Best Article published in 2022, Field of Obesity and Nutrition (FSEEN and Lilly). I participated in 26 national and international meetings with oral or poster presentations, invited speaker in events such as International Liver Congress 2022 (UK) and to the Amsterdam University Medical Hospitals (Netherlands), established partnership with industry via Prodigy BioTech (USA). I was also co-Director of 6 Final Degree Projects, Evaluator of 4 doctoral theses in Spain and internationally, performed 165 h of official teaching at the USC, and often served as peer reviewer for journals such as Journal of Hepatology, Gastroenterology, and Metabolism.

Resumen del Currículum Vitae:

I have nine years of research experience in chronic liver diseases. During my PhD, under the supervision of Rubén Nogueiras and Carlos Diéguez (Spain), I focused on understanding how cell cycle regulators control lipid and glucose metabolism in hepatocytes and stellate cells, and how their deregulation promotes metabolic dysfunction-associated steatotic liver disease and hepatic fibrosis.

As a postdoc, I joined Bernd Schnabl lab (United States) to study the profound impact of ethanol on different intestinal cell populations—mainly macrophages and intestinal epithelial cells—to determine how these alterations impair gut barrier function and aggravate alcohol-associated liver disease.

By combining my experience in cell cycle regulation and intestinal barrier function, I was able to establish my own research line supported by my independent funding. I discovered how intestinal epithelial cells undergo senescence upon chronic ethanol consumption, promoting dysregulated intestinal permeability and triggering alcohol-associated hepatitis. This work gave me the opportunity to become an expert in intestinal cell signaling and the gut-liver axis in chronic liver disease.

Now, I aim to establish my own group in Spain to provide an original perspective in the overlapping areas of intestinal epithelial cell metabolism, gut function, and chronic liver disease.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Biomedicina

Nombre:

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Título:

Uncovering Gut Immune Dynamics in Health and Disease using Single-Cell and Spatial Omics

Resumen de la Memoria:

During my career, I have conducted research in 1 national and 3 international research centres (10 years abroad), developing a strong scientific track record.

After an outstanding PhD that led to 4 first authorships in top-tier scientific journals (JEM, JACI, Mucosal Immunol.), as a postdoc, I published a Nature paper without my PhD supervisor as a co-author. Then, I joined the Institute for Cancer Research (Oslo) as an Independent Junior Researcher, and I secured my own funding from the Norwegian Cancer Society to establish my own research line in January 2025. Despite working on this project for less than a year (as I started Maternity Leave in September this year), I successfully established both wet-lab and dry-lab methods and published an article in Gut without my PhD/ postdoc supervisor. In summary, I have accumulated a total of 764 citations throughout my career (665 citations in the last 5 years, according to Google Scholar as of 10 December 2025). My leadership skills are reflected in the fact that I have published 2 research articles as a corresponding author and have secured a total of 12 million NOK in research funding (over 1 million euros).

Summary of the research line:

Mounting evidence shows that the microbiome may modulate cancer development, progression, metastasis formation, and response to treatment in CRC. However, the specific cellular and molecular mechanisms governing the crosstalk between the microbiome, cancer cells, and the immune system, and how each contributes to promoting or hindering cancer immunity, remain unknown.

Here, I aim to provide a holistic characterization of the tumor microenvironment (TME) in CRC primary tumors and liver metastases, with a special focus on the interplay between the microbiome, cancer cells, and immune cells. For this, I will leverage an interdisciplinary approach, to comprehensively profile the CRC tumor landscape by combining cutting-edge single-cell and spatial transcriptomic and proteomic approaches (WP1, WP2), microbiome sequencing and metagenomic analysis, multimodal analysis and computational modelling (WP3), and validations using metabolomics and functional assays in patient-derived tumor organoids (WP4) to explore the anti-tumor capacity of specific intra-tumoral bacteria and their metabolites.

The strength of this project lies in my expertise in mucosal immunology (from my PhD training) and the single-cell and spatial analyses I developed as a postdoc (see, for example, Gu and Bartolome-Casado Nature 2024), combined with my recent experience in cancer immunology and cancer genomics. This project represents a natural evolution of my research trajectory within my unique research niche. Through this project, I aim to further consolidate my position as an independent researcher and establish myself as an international reference in my field of research. In addition, my expertise is complemented by a broad network of local and international collaborators with strong and complementary skills in machine learning, computational oncology and microbiology. My expertise will significantly strengthen the host institution's research by bringing a unique combination of skills in advanced single-cell and spatial methods, mucosal immunology and cancer genomics, thereby enabling new lines of investigation and fostering interdisciplinary collaborations.

Resumen del Currículum Vitae:

In 2015, I moved to Norway to pursue my PhD at Prof. Frode Jahnsen's lab, Dept. of Pathology, Oslo University Hospital. I defended the thesis "Longevity of the adaptive immune cell compartment in the human small intestine" in 2020. These findings have significant implications for mucosal vaccination and resulted in four influential publications in leading journals, including one article as first author and one as third author in the Journal of Experimental Medicine, one in the Journal of Allergy and Clinical Immunology (co-first author) and one in Mucosal Immunology (first author). In recognition of this work, I received the 2019 International Congress of Mucosal Immunology Rising Stars Award from the Society for Mucosal Immunology, as well as other prestigious national awards for my PhD thesis.

As a postdoctoral researcher, I joined Prof. Sarah Teichmann lab at the Wellcome Sanger Institute (Cambridge, UK) from 2021-2023, supported by my own funding from the Research Council of Norway. Together with Sarah Teichmann, I supervised a PhD student and a postdoc. In a collaboration between Teichmann lab and Powrie's lab (Oxford, UK), I characterized key cell-cell interactions within the intestinal niches that maintain immune tolerance (Nature, co-first author). Also, I worked on a Human Cell Atlas project mapping all the cell types across the gastrointestinal tract using single-cell transcriptomics, published in Nature (as third author). In addition, I helped develop novel bioinformatic pipelines for high-density spatial analysis (Bin2Cell, Bioinformatics 2024) and reconstruction of microbial reads from transcriptomic sequencing data (Dreamcatcher)

In 2024, I joined the Lothe lab at the Institute for Cancer Research (Oslo), and secured funding as a Junior Principal Investigator (2025-2029; 8 million NOK) from the Norwegian Cancer Society to investigate the interplay among cancer cells, immune cells, and the microbiome in colorectal cancer (CRC). Since then, I have established my independent research program and developed an innovative research platform using single-cell and spatial technologies to identify new therapeutic avenues for CRC patients.

In summary, I have conducted research in 3 international and 1 national research centres, developing a strong scientific track record. I have participated in 11 research projects, in 2 of them as principal investigator (PI). I have gained extensive expertise across a broad range of research technologies, spanning wet-lab methods and bioinformatic analyses. I have published 13 indexed articles in international journals (10 in Q1/D1), including 5 first-author publications (all Q1/D1) and 2 corresponding-author publications. In total, 10 original articles and 2 reviews. I have presented my work at 18 scientific meetings (2 invited talks, 4 oral presentations, 10 posters). Over the years, I have built productive collaborations with international experts



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Turno General

at leading institutions and successfully mentored students at multiple stages of their training. My leadership skills are evidenced by securing competitive research funding, being Project Manager in several research projects, publishing several articles in top-tier journals without my PhD supervisor (Nature, Gut) and serving as corresponding author on several high-impact publications.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Biomedicina

Nombre:

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RYC2025-057241-I

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Título:

Elucidating selective axonal vulnerability in Neurodegenerative Diseases

Resumen de la Memoria:

I am currently a Principal Investigator (PI) with a contract of Assistant Project Scientist at the University of California, San Diego (UCSD). As a dedicated researcher in the field of Neuroscience, I am focused in understanding the cellular and molecular mechanisms that drive neurodegenerative diseases, including Amyotrophic Lateral Sclerosis (ALS), Frontotemporal Dementia (FTD), and X-linked Adrenoleukodystrophy (X-ALD). My career in research spans over more than 17 years, encompassing extensive training and continuous research in areas of neurodegeneration, RNA metabolism, axonal degeneration and mitochondrial dysfunction and more recently, multimodal spatial transcriptomics. As a Principal Investigator I have attracted competitive funding to initiate my independent research line, including a Support Grant from the Center for Neurological Studies (CNS) to cover my PhD student Olatz Arnold-García's salary and project. I have also applied to additional funding to establish myself as a fully independent investigator.

My Ph.D. in Biomedicine (University of Barcelona) focused on mitochondrial dysfunction and oxidative stress in X-linked adrenoleukodystrophy (X-ALD) under the supervision of Prof. Aurora Pujol at IDIBELL. The work I developed uncovered major mechanisms involved in the pathogenesis of X-ALD (Lopez-Erauskin et al., Brain 2012 and Lopez-Erauskin et al., Hum Mol Genet, 2013) and contributed directly to a pilot clinical trial in patients (NCT1495260) (Lopez-Erauskin et al., Ann Neurol 2011).

For my postdoctoral training, I moved to the University of California, San Diego, (USA) to the lab of Prof. Don W. Cleveland, a world leader in ALS research. Here, I made critical contributions to our understanding of ALS/FTD pathogenesis. I demonstrated that mutations in FUS (causative familial ALS) impair intra-axonal protein synthesis (Lopez-Erauskin et al., Neuron 2018). I also identified stathmin-2 as a crucial regulator of axonal regeneration in motor neurons following loss of TDP-43 (disease hallmark for ALS) (Melamed, Lopez-Erauskin et al., Nat Neurosci 2019), and that stathmin-2 loss from mammalian nervous system is sufficient by itself to induce the initiating steps of ALS (Lopez-Erauskin et al., Nat Neurosci 2024). Together with my colleagues, I demonstrated stathmin-2's therapeutic potential (Baughn*, Melamed*, Lopez-Erauskin et al., Science, 2023), where I merited a second authorship. Most recently, we established stathmin-2's ability to promote motor axon regeneration independently of tubulin binding (Beccari et al. PNAS, 2025) where I signed as senior and co-corresponding author.

I have attracted competitive funding to initiate my independent research line, and I have applied to additional funding that is now pending of resolution. I currently supervise 3 undergraduates, 2 PhD students and 2 postdocs and I coordinate 3 multimodal spatial transcriptomic efforts aimed at elucidating transcriptomic changes in FTD and ALS postmortem samples.

As independent Group Leader, my long-term goal is to define how RNA dysregulation in ALS drives neuromuscular disruption and selective vulnerability and translate these findings into RNA-based therapeutic strategies.

Resumen del Currículum Vitae:

I am currently a Principal Investigator (PI) with a contract of Assistant Project Scientist at the University of California, San Diego (UCSD). My career in research spans over more than 17 years. I earned my PhD in Biomedicine from University of Barcelona under the supervision of Dr. Aurora Pujol in IDIBELL. For my postdoctoral training I moved to University of California, San Diego California, USA, to the laboratory of Dr. Don Cleveland. I have extensive training and continuous research in areas of neurodegeneration, RNA metabolism, axonal degeneration and mitochondrial dysfunction. I have a strong publication record: 15 publications, all in Q1, 8 as first author, and 1 as Senior/Corresponding author. h-index: 13. Total citations: 2038.

1. Beccari et al. López-Erauskin J*#(CA), Cleveland DW*# PNAS (2025)
2. Launay N*, López-Erauskin J*, et al. Brain (2024)
3. López-Erauskin J*, et al. Lagier-Tourenne Nature Neuroscience (2024)
4. Baughn MW*, Melamed Z*, López-Erauskin J, et al. Cleveland. Science (2023)
5. Melamed Z, López-Erauskin J, et al Nature Neuroscience (2019)
6. López-Erauskin J, et al. Neuron (2018)
7. López-Erauskin J, et al. Pujol A. Hum Mol Genet (2013)
8. López-Erauskin J, et al. Pujol A. Brain (2012)
9. López-Erauskin J, et al. Pujol A. Annals of Neurology (2011)

Research projects as Principal Investigator (PI)

1. Packard Center for ALS Research. Project: Dissecting C9ORF72 ALS/FTD and sporadic ALS using single cell spatial transcriptomics. Amount: \$75,000.00 (2024-2025) Co-PIs: Dr. Lopez-Erauskin with Dr. Cleveland Role: Role: PI
2. Packard Center for ALS Research. Project: Dissecting C9ORF72 ALS/FTD and sporadic ALS using single cell spatial transcriptomics (Renewal). Amount: \$100,000.00 (2025-2026) Co-PIs: Dr. Lopez-Erauskin and Dr. Cleveland. Role: PI
3. Center for Neurological Studies (CNS). Project: Determining the molecular basis for synergy from C9orf72 loss-of-function and G4C2 repeat expansion linked gain-of- toxicity. CNS Support Grant including salary for my PhD student Olatz Arnold-Garcia. Amount: \$300,000.00 (2024-2026) Role: PI



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Turno General

4. Muscular Dystrophy Association (MDA) Project: Mechanisms of maintenance and regeneration of neuromuscular junctions in ALS. Amount: \$210,000.00 (2019-2022). Role: PI.

Contract with Pharmaceutical company (Biogen): Project title: Pathological Mechanism of C9ORF72 repeat expansion identified by multimodal spatial transcriptomics. Multi-PI: Dr.s Jone Lopez-Erauskin, Don Cleveland, Bogdan Bintu. \$882,281.00 (2025-2027). Role: PI

Awards and Honors

2025-Present: Scientific Advisor at DalecandELA, Spanish ALS Research Association

2024-Present: Scientific Advisor at AskHelpU, Chinese ALS Research foundation

2022: Healey Center and Lalji Family ALS Endowed Award for Innovative Healing

2019: Barber Family ALS Research Award 2019. Golden Chapter ALS Association

2016-2018: Milton-Safenowitz Postdoctoral Fellowship 2016 ALS Association

2014: Outstanding Ph.D. Thesis Award 2013 from the University of Barcelona, Spain

2011: CIBERER fellowship for short PhD internship, Spanish Ministry of Education 2011

2008-2012: Predoctoral Fellowship from the Department of Education of the Government of Basque Country (BFI07.126)

2005-2007: MEC/AGAUR Award for Outstanding Students, Spanish Ministry of Education



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Turno General

Área Temática: Biomedicina
Nombre: PINEDA PARDO, JOSE ANGEL
Referencia: RYC2025-055730-I
Correo Electrónico: jpineda.hmcinac@hnhospitales.com
Título: Neuroimagen multimodal y ultrasonidos focalizados: biomarcadores, mecanismos y nuevas terapias en enfermedad de Parkinson

Resumen de la Memoria:

Mi trayectoria investigadora integra ingeniería biomédica, neuroimagen y ultrasonidos terapéuticos aplicados a enfermedades neurodegenerativas. Durante la tesis doctoral en la UPM (Centro de Tecnología Biomédica) trabajé en conectividad multimodal y análisis de grafos en deterioro cognitivo leve, demostrando que la conectividad funcional guiada por tractografía mejora la discriminación de MCI con MEG en reposo (Pineda-Pardo et al., 2014), y consolidando una aproximación de redes que ha impregnado mi trabajo posterior.

Desde 2015, en CINAC, he desarrollado de forma progresivamente independiente dos líneas centrales: (1) biomarcadores de imagen en Parkinson y (2) terapias con ultrasonido focalizado guiado por MRI (MRgFUS). En la primera, he contribuido a redefinir la topografía de la degeneración nigroestriatal con PET y MRI cuantitativa, mostrando que la denervación sigue un patrón somatotópico y cuestionando la visión clásica del putamen dorsal posterior como punto de inicio (Pineda-Pardo et al., 2022). Más recientemente, como autor de correspondencia, he caracterizado la degeneración microestructural y la acumulación de hierro nigroestriatal a lo largo de la progresión de la enfermedad (López-Aguirre et al., 2023; López-Aguirre et al., 2025), avanzando hacia biomarcadores integrados de inicio y progresión.

En paralelo, he sido un actor clave en la traslación clínica del ultrasonido focalizado. He participado en más de diez ensayos MRgFUS para temblor esencial y enfermedad de Parkinson, incluyendo el ensayo aleatorizado de subthalamotomía (Martínez-Fernández et al., 2020) y estudios posteriores sobre subthalamotomía unilateral y bilateral, liderando análisis de cráneo, modelado de dosis térmica, caracterización de lesiones y su relación con la eficacia clínica (Pineda-Pardo et al., 2019; López-Aguirre et al., 2021). He impulsado también el uso de LIFU para apertura de barrera hematoencefálica, demostrando su seguridad y viabilidad en pacientes con Parkinson (Pineda-Pardo et al., 2022; Gasca-Salas et al., 2021) y en primates no humanos, así como su potencial para el suministro de terapia génica (Blesa & Pineda-Pardo et al., 2023) y sintetizando los retos traslacionales en una revisión de referencia (López et al., 2024).

Estas líneas confluyen en un programa propio orientado a decisiones clínicas apoyadas en datos. Como IP de dos proyectos nacionales consecutivos (DREAM-ON-FUS; D3-HIFU), estoy desarrollando marcos de dosis-respuesta para LIFU-BBBO y una plataforma de soporte a la decisión basada en un registro multicéntrico de >2400 procedimientos HIFU, integrando IA y datos del mundo real para estandarizar la selección de pacientes, la planificación, la dosimetría térmica y la evaluación de resultados.

Además de una producción de 76 artículos y >3400 citas, he consolidado un laboratorio activo en neuroimagen y ultrasonidos terapéuticos en CINAC, con 2 tesis doctorales defendidas, 2 en curso y >20 TFG/TFM dirigidos, y colaboraciones estables con grupos internacionales en neuroimagen y ultrasonidos (Nottingham/Oxford, UCL). En conjunto, mi trayectoria muestra una evolución clara desde el desarrollo metodológico en neuroimagen de redes hacia el liderazgo de un programa traslacional que integra biomarcadores multimodales, neuromodulación y modelos IA para transformar el manejo de la enfermedad de Parkinson y otros trastornos del movimiento.

Resumen del Currículum Vitae:

José A. Pineda-Pardo es Investigador en el Centro Integral de Neurociencias HM-CINAC (Fundación de Investigación HM Hospitales), donde lidera el laboratorio de Neuroimagen y Ultrasonidos Terapéuticos (NTUSLab). Ingeniero de Telecomunicación (Universidad de Sevilla), Máster y Doctor en Ingeniería Biomédica (UPM), su trayectoria combina ingeniería, neurociencia clínica y desarrollo tecnológico orientado a la enfermedad de Parkinson y otros trastornos del movimiento.

Su investigación se centra en tres ejes: (i) biomarcadores de neuroimagen multimodal (MRI avanzada, PET, MEG) para diagnóstico precoz, progresión y respuesta a tratamiento en enfermedades neurodegenerativas; (ii) desarrollo y validación clínica de terapias basadas en ultrasonido focalizado guiado por MRI (MRgFUS) para termoablación, neuromodulación y apertura de barrera hematoencefálica; y (iii) integración de inteligencia artificial y datos de práctica clínica para apoyar la toma de decisiones en intervenciones guiadas por imagen.

Es autor de 76 publicaciones JCR en revistas de alto impacto (NEJM, Lancet Neurology, JAMA Neurology, Science Advances, Nature Communications, Brain, NPJ Parkinson's Disease, Movement Disorders, entre otras), con >3.400 citas y un índice h=35 (Google Scholar). Ha contribuido de forma clave a la caracterización de la topografía nigroestriatal en el Parkinson, a la demostración de la seguridad y viabilidad de la apertura de la barrera hematoencefálica con ultrasonidos en pacientes y primates no humanos, y al uso de modelos cuantitativos para optimizar la planificación y el control de tratamientos MRgFUS.

Ha participado en más de 10 ensayos clínicos con MRgFUS para temblor esencial y enfermedad de Parkinson (incluyendo ensayos randomizados publicados en NEJM y JAMA Neurology), actuando como enlace entre ingeniería y clínica: selección de pacientes, análisis de cráneo, modelado de dosis térmica, definición de dianas y análisis de imagen post-tratamiento. Es Investigador Principal de dos proyectos consecutivos del Ministerio de Ciencia (DREAM-ON-FUS y D3-HIFU), que estructuran un programa propio en apertura de barrera hematoencefálica con LIFU y en plataformas de soporte a la decisión para HIFU basadas en registros multicéntricos y modelos de IA.

En el plano formativo, ha dirigido 23 TFG, 6 TFM y 4 tesis doctorales (2 defendidas y 2 en curso), y ha sido profesor en la Universidad CEU San Pablo y en programas de máster especializados en trastornos del movimiento. Es miembro fundador y Tesorero del Iberian Chapter de la ISMRM, revisor



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Turno General

habitual de revistas internacionales y participa en consorcios y redes internacionales (p.ej., proyectos JPND, ASAP, Focused Ultrasound Foundation), impulsando estándares, registros abiertos y la creación de una red clínica HIFU que integrará >2.000 procedimientos para generar evidencia robusta y herramientas de IA traslacionales en ultrasonido terapéutico.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: BLANCO DOMÍNGUEZ, RAFAEL
Referencia: RYC2025-055325-I
Correo Electrónico: rafaelblancodguez@gmail.com
Título: Harnessing engineered gamma-delta T cells to strengthen immunotherapy for colorectal cancer

Resumen de la Memoria:

My research career has centered on translating fundamental principles of immune regulation into clinically actionable therapies. During my postdoctoral work, I specialized in Vd1 gamma-delta (gd) T cell biology and contributed to the development of Delta One T (DOT) cells, a clinical-grade Vd1 product currently in human trials. I established patient-derived organoid and orthotopic CRC xenograft platforms and generated the first evidence that DOT cells can recognize and kill colorectal cancer (CRC) tumors. These studies revealed both the therapeutic promise of gd T cells and the barriers imposed by the immunosuppressive CRC tumor microenvironment (TME). Building on this foundation, the present project represents a decisive shift toward my independent research line by focusing on rational engineering of Vd1/DOT cells—an approach I have not previously pursued.

CRC remains one of the deadliest cancers, and most patients do not benefit from current immunotherapies. Alpha-beta (ab) T cell-based treatments, including ICIs and CAR-T cells, are limited by tumor infiltration, antigen escape, and rapid dysfunction within the TME. Even advanced modalities such as STAb-T cells or armored CAR-T cells face intrinsic constraints derived from ab T cell biology and the requirement for autologous products. Vd1 gd T cells offer a transformative alternative: they recognize stressed tumor cells independently of HLA, resist antigen-loss escape, and can be manufactured from healthy donors as off-the-shelf therapies. However, systematic engineering of the Vd1 subset—particularly for solid tumors—remains unexplored.

This project aims to develop the first engineered Vd1/DOT (eDOT) platform optimized for CRC, while simultaneously uncovering fundamental rules governing gd T cell function in solid tumors. The program is structured into three synergistic objectives:

Aim 1 will generate and benchmark three eDOT designs—CAR-expressing, STAb-secreting, and dual CAR-STAb variants—using CEA as a model antigen. Their cytotoxicity, persistence, and ability to modulate bystander immunity will be tested in CRC cell lines, patient-derived organoids, and the orthotopic CRC model I established. The best-performing platform will be selected for downstream optimization.

Aim 2 will define how the CRC TME reshapes DOT/eDOT cells in vivo, using single-cell RNA-seq, CITE-seq, flow cytometry, and spatial transcriptomics. This will create the first atlas of Vd1 T cell adaptation, dysfunction, and metabolic stress in solid tumors, revealing actionable pathways for next-generation engineering.

Aim 3 will functionally validate the key nodes identified in Aim 2 using perturbations (CRISPR editing, inhibitors, blocking antibodies) and incorporate promising modifications into the eDOT backbone. These next-generation eDOTs will be evaluated for improved tumor control, persistence, and resistance to TME pressures.

By uniting advanced cell engineering with mechanistic dissection of endogenous and adoptive gd T cell biology, this project establishes a fully independent research trajectory. Its long-term impact is the creation of metabolically resilient, persistent, and potent allogeneic Vd1 cell therapies that could transform treatment for CRC and other solid tumors, improving outcomes and broadening access to off-the-shelf immunotherapy.

Resumen del Currículum Vitae:

I am a translational immunologist dedicated to transforming fundamental immune discoveries into clinically relevant solutions. My work consistently bridges basic mechanisms and patient impact, applying immunology to address pressing health problems.

In 2022 I completed my PhD at CNIC (Spain), with secondments at La Jolla Institute for Immunology and Massachusetts General Hospital. My doctoral research focused on T cell-derived regulatory molecules in cardiovascular disease. I identified the first non-invasive biomarker for myocarditis, a Th17-derived non-coding RNA (Blanco-Domínguez et al., NEJM 2021, over 150 citations), and coordinated a multi-center clinical cohort that led to Spain's first national registry of immunotherapy-related cardiovascular complications. In parallel, I discovered a novel population of Treg cells crucial for cardiac repair after myocardial infarction (Blanco-Domínguez et al., JCI 2022), receiving the ESC Young Investigator Award. My thesis was recognized with multiple awards, including the Premio Extraordinario UAM, the Margarita Salas Award and the Enrique Fuentes Quintana Prize.

As an EMBO Postdoctoral Fellow in Prof. Bruno Silva-Santos' lab (GIMM, Lisbon), I have established an independent research niche in gamma-delta (gd) T cell biology and immunotherapy. I played a central role in developing Delta One T (DOT) cells, a gd T cell-based therapeutic for solid tumors. My recent work demonstrated the preclinical efficacy of DOT cells in colorectal cancer (Blanco-Domínguez et al., Nat Cancer 2025), which attracted international attention, received media coverage, and culminated in a patent filing. Alongside this, I developed tools for immunotherapy pipelines, including methods for processing colorectal tumors for cytotoxicity assays and an orthotopic xenograft model.

In parallel, I co-lead a Sponsored Research Agreement with Takeda Pharmaceuticals, overseeing strategy and execution for gd T cell-based therapeutic platforms (including CAR-gd T cells and engagers). In this capacity, I lead a multidisciplinary team of four researchers, manage preclinical development pipelines, and drive translational progress towards clinical application.

I have an extensive record of dissemination and mentorship: 7 awarded oral communications, 3 invited international talks, co-leadership of competitive grant applications, and successful supervision of BSc and MSc theses. My commitment to education includes more than 1,000 hours of lectures and practical instruction in Biochemistry and Immunology at the Universidad Autónoma de Madrid and Universidade de Lisboa.

Overall, my career has consistently advanced discoveries from fundamental immunology toward clinical implementation, with a strong track record in high-impact publications, patents, translational collaborations, and recognition through awards. As I transition to independence, my vision is to leverage immune regulation and gd T cell biology to develop transformative immunotherapies.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: TOLEDO SOLER, MIRIAM
Referencia: RYC2025-054891-I
Correo Electrónico: miriam.toledo85@gmail.com
Título: Investigación en metabolismo, caquexia y regulación neurointestinal

Resumen de la Memoria:

My research career has centered on understanding the molecular mechanisms of metabolism, spanning diverse fields such as cancer cachexia, autophagy, circadian rhythms, gut microbiota, and mitochondrial dynamics. My work in cancer cachexia began during my Bachelor's project under the mentorship of Drs. Josep M. Argilés and Sílvia Busquets, where I explored combined anti-tumor and anti-cachectic therapies to combat muscle wasting. These findings contributed to shaping clinical trials, leading to impactful publications and earning me the Extraordinary Doctoral Prize from the University of Barcelona.

In my postdoctoral research at Albert Einstein College of Medicine in New York, I expanded my focus to autophagy and circadian rhythms. I made a groundbreaking discovery that autophagy regulates the liver clock and glucose metabolism by degrading the clock repressor CRY1. Published in *Cell Metabolism* and highlighted by Faculty of 1000, this work has important implications for diabetes and metabolic disorders. I also contributed to studies on isocaloric twice-a-day feeding and the mTORC2-NDRG1-CDC42 axis, which demonstrated the role of autophagy in metabolic health and mitochondrial fission during fasting. My ability to secure independent funding from the American Diabetes Association and recognition through the Dennis Shields Post-Doctoral Award showcased my potential as a leader in the field.

In 2019, I joined Dr. Marc Claret's laboratory at IDIBAPS, where I lead a project investigating the hypothalamic regulation of gut function and microbiota composition. My research uncovered a novel brain-to-gut axis, modulating gut microbiota in response to neuronal and hormonal cues. This work, recently published at *Nature Metabolism*, opens new therapeutic avenues for metabolic diseases. My research at IDIBAPS have always been supported by prestigious fellowships, including PERIS, Beatriu de Pinós, and the Seal of Excellence contract from ISCIII-Health.

My current research aims to investigate the role of mitochondrial dynamics in gut-related diseases, particularly inflammatory bowel disease (IBD). Mitochondrial dysfunction has emerged as a key factor in IBD pathogenesis, and I aim to explore how mitochondrial fission, fusion, and mitophagy affect intestinal epithelial health and immune responses. This novel line of research will integrate mitochondrial biology with gut function, offering potential therapeutic targets for IBD and other gut-related disorders. I have already gathered significant preliminary data, presented at international conferences, and plan to further develop this research to identify new treatment strategies.

Resumen del Currículum Vitae:

I am a Junior Researcher at IDIBAPS with extensive experience in metabolism research, including cancer cachexia, autophagy, circadian rhythms, and gut-related diseases. My research journey began at the University of Barcelona, where I earned my PhD under the mentorship of Drs. Josep M. Argilés and Sílvia Busquets, focusing on cancer cachexia and developing therapeutic strategies to combat muscle wasting. My findings were pivotal in advancing clinical trials, and I published over 20 articles, including 8 as the first author, which earned me the Extraordinary Doctoral Prize.

During my postdoctoral training at Albert Einstein College of Medicine, I made key discoveries in the regulation of glucose metabolism by autophagy. I demonstrated that autophagy degrades CRY1 to regulate hepatic gluconeogenesis, uncovering a novel link between autophagy and circadian biology. This work, published in *Cell Metabolism*, has important implications for metabolic diseases like diabetes and aging. I also contributed to pioneering studies on isocaloric twice-a-day feeding, showing the systemic benefits of autophagy across multiple tissues. Additionally, I played a crucial role in deciphering the mTORC2-NDRG1-CDC42 axis, demonstrating how fasting induces mitochondrial fission to maintain energy homeostasis.

Since 2019, I have been leading projects at IDIBAPS under the mentorship of Dr. Marc Claret, focusing on the hypothalamic control of gut function and microbiota. My research revealed a novel brain-to-gut axis that modulates microbiota composition and energy balance regulation. This work was published at *Nature Metabolism* and holds significant potential for therapeutic applications in metabolic diseases. I have secured prestigious fellowships, including the PERIS and Beatriu de Pinós postdoctoral Fellowships, and more recently, the Seal of Excellence contract from ISCIII-Health, which has allowed me to develop my own research lines.

My current research focuses on mitochondrial dynamics in gut-related diseases, specifically IBD. Mitochondrial dysfunction is a critical factor in the pathogenesis of IBD, and I aim to investigate how fission and fusion processes influence intestinal health and inflammation. This project integrates my expertise in mitochondrial biology and gut function, and I have already presented compelling preliminary data at international conferences. My goal is to uncover novel therapeutic strategies for IBD by targeting mitochondrial dynamics.

Throughout my career, I have demonstrated leadership in research, securing competitive funding, publishing in high-impact journals, and mentoring students. I have actively participated in science communication through public outreach initiatives like Pint of Science and Crazy about Biochemistry. My experience in organizing IDIBAPS seminars and mentoring junior researchers further showcases my commitment to fostering the next generation of scientists. I am well-prepared to establish an independent research career focused on metabolism and gut-related diseases, and I aim to continue advancing knowledge in these fields to improve patient outcomes.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: MIGUEZ CABELLO, FEDERICO
Referencia: RYC2025-054306-I
Correo Electrónico: federico.miguez@mcgill.ca
Título: on Channel Biophysics and AMPA Receptor Mechanisms in Health and Disease
Resumen de la Memoria:

My research trajectory has focused on understanding the molecular and biophysical mechanisms of ionotropic glutamate receptors, with a particular emphasis on AMPA receptors (AMPA) and their auxiliary proteins. During my PhD, I developed expertise in receptor biophysics, electrophysiology, and structure-function relationships, contributing to the characterization of pathological mutations, ion permeation, and gating mechanisms. This work established a strong foundation in molecular neuroscience and positioned me to study how receptor dysfunction contributes to human neurological disorders.

As a postdoctoral researcher at McGill University, I expanded this expertise by working in one of the leading laboratories in ion-channel biophysics. There, I optimized and implemented advanced patch-clamp electrophysiology and simultaneous calcium-imaging approaches, contributing to high-impact studies, including work published in Nature. I participated in multiple international collaborations involving AMPA and kainate receptors, contributing experimental data, mechanistic interpretation, and methodological innovation. I also trained undergraduate, master's, and PhD students, consolidating my capacity to mentor and lead scientific projects. Through these experiences, I developed an independent scientific identity centered on AMPAR function, remodeling, and translational relevance.

Building on this trajectory, my Ramón y Cajal research program will investigate how AMPAR complexes are reconfigured in chronic pain, with a specific focus on dorsal root ganglia (DRG) sensory neurons. Although AMPARs mediate most fast excitatory transmission, their subunit composition, auxiliary-protein diversity, and context-dependent function in peripheral nociceptive circuits remain poorly defined. This knowledge gap limits the design of targeted therapies capable of modulating maladaptive plasticity without broad CNS effects. My project integrates transcriptomics, electrophysiology, and pharmacology to identify the receptor-auxiliary assemblies driving sensitization and to uncover selective molecular targets for future analgesic strategies.

In the longer term, I aim to extend this line of work toward the study of AMPAR signaling in peripheral organs, such as the pancreas and gastrointestinal system, where transcriptomic evidence indicates the presence of AMPAR complexes whose physiological roles are still unknown. Few groups worldwide investigate AMPARs outside the CNS, positioning this emerging field as a unique opportunity to develop a pioneering and competitive research niche within Spain.

Overall, my trajectory demonstrates a coherent progression from fundamental receptor biophysics toward a mechanistic and translational research program with clear societal impact. The proposed line of research establishes the basis for an independent group capable of integrating multi-scale approaches to address medically relevant questions in sensory neuroscience.

Resumen del Currículum Vitae:

My research career is centered on the molecular and biophysical analysis of ionotropic glutamate receptors, particularly AMPA and kainate receptors, and their involvement in human neurological disorders. I have co-authored publications in leading journals including Nature (as first author), eLife (as first author), Neuron, Annals of Neurology, Nature Structural & Molecular Biology (NSMB), Frontiers in Cellular Neuroscience, and International Journal of Molecular Sciences. Across these works I contributed electrophysiological data generation, mechanistic interpretation, and variant- or antibody-specific functional analysis. Several studies addressed patient-derived GRIN variants and autoantibody-mediated receptor dysfunction, integrating receptor biophysics with clinical genetics.

During my PhD, I developed a strong foundation in patch-clamp electrophysiology and ion-channel biophysics, contributing to multi-institutional studies on GRIN channelopathies and glutamate-receptor autoimmunity. My work included experimental design, whole-cell recordings, kinetic analysis, data interpretation, and collaboration with clinical teams. This research led to peer-reviewed publications and presentations at multiple national and international conferences, helping establish my early scientific visibility.

As a postdoctoral researcher at McGill University, I expanded my methodological and conceptual expertise within a world-leading ion-channel biophysics group. I established and optimized a full patch-clamp electrophysiology setup and implemented simultaneous patch-clamp and calcium-imaging recordings, enabling high-resolution characterization of AMPA receptor permeation and auxiliary-subunit modulation. These methods were instrumental in several published and ongoing projects, including a Nature study on AMPAR permeation and a structural-functional investigation published in NSMB. I also contributed to collaborative projects on kainate receptor pharmacology, generating datasets used to validate novel modulators in partnerships with groups in Canada, Denmark, Germany, and the United States.

I have also provided conceptual and analytical support for successful grant applications, including CIHR-funded research, and received specialized training from Sophion Bioscience in automated patch-clamp technologies, strengthening my methodological versatility and industry connections.

In parallel, I have mentored undergraduate, master's, and PhD students, supervising their experimental work and guiding their development in electrophysiology, calcium imaging, and data analysis. This demonstrates leadership, scientific maturity, and the ability to train young researchers—skills essential for building an independent research line.

Overall, my curriculum reflects a publication record on high-impact journals, international mobility, multidisciplinary collaboration, and advanced methodological expertise. This trajectory provides a solid foundation for establishing an independent research program focused on AMPAR molecular diversity and function in physiological and pathological contexts, with long-term potential to expand into receptor biology in peripheral systems.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Biomedicina

Nombre:

FERNANDES DE SOUSA RAFAEL, DIANA

Referencia:

RYC2025-056251-I

Correo Electrónico:

diana.fernandes_de_so@vhir.org

Título:

Pharmaceutical Technology: Smart Drug Delivery Platforms for Precision and Localized Cancer Therapy

Resumen de la Memoria:

Diana Rafael possesses a Master in Pharmaceutical Sciences (2010) granted by Lisbon University, Portugal, and a PhD degree in Pharmaceutical Technology (2017) from the same University. The PhD financed by a competitive predoctoral fellowship of the Fundação para a Ciência e a Tecnologia (FCT), counted with the collaboration and research stays at the international institutions Ludwig Maximilian University (LMU), Munich, Germany, Bellvitge Biomedical Research Institute (IDIBELL), and Vall d'Hebron Research Institute (VHIR), Barcelona, Spain. Since 2013, Diana has been associated with the Clinical Biochemistry, Drug Delivery, and Therapy Group from VHIR, first as a PhD Student, then as a postdoctoral researcher (with a > 1-year postdoctoral training in Chile), and nowadays as a Principal Investigator. During this time, she developed her research career and established a new research line in the group focused on the design, development, and preclinical validation of innovative nanotechnology-based drug delivery systems for challenging diseases with limited therapeutic options, with a particular emphasis on oncology. In recent years, she has also led the implementation of a new research line focused on the development of smart and multifunctional hydrogel-based formulations for the localized and controlled release of drugs.

Being a multidisciplinary scientist, during her research career she acquired expertise in different areas of knowledge such as Pharmaceutical Technology, Nanomedicine, Chemistry, Molecular Biology, Cancer Signaling Pathways, Preclinical Validation, etc. Her broad knowledge in the field of biomedical sciences allows her to have a comprehensive and integrative view of the different stages of drug development from the bench to the bedside. Her main research lines are based on:

- i) Design and development of nanotechnology-based formulations (nanoparticles and hydrogels) for the administration of different cargos (drugs, genetic material, biomolecules) against several challenging diseases, with special focus on cancer treatment
 - ii) Nanoparticles surface functionalization for active targeting of specific cells/organs of interest
 - iii) Modulate hydrogel properties (gelation and release profile) based on clinical application
 - iv) Preclinical validation of formulations by advanced in vitro models and molecular biology techniques
 - v) Study and characterization of the molecular pathways involved in cancer development and progression to find new promising targets and biomarkers
- Her work seeks to solve medical problems with no satisfactory clinical responses to the actual treatments and to improve patient's quality of life, which could have an important impact on society. Another goal is related to her commitment to "Green Chemistry" principles and her efforts to proceed to a total "Greenization" of formulations. Also, she is implementing in silico prediction assays and bioinformatic tools to the rational design of formulations, to decrease the number of unnecessary experimental work, reducing waste and optimizing the available resources.

Recently, Diana also implemented a new section dedicated to Nanosystems synthesis and characterization to the Functional Validation and Preclinical Research (FVPR) platform (ISO9001:2015 certification), belonging to Nanbiosis (ICTS) from CIBER-BBN, to provide a set of services to different institutions.

Resumen del Currículum Vitae:

Diana Rafael, PharmD, PhD in Pharmaceutical Technology (2017) is a Principal Investigator at the Clinical Biochemistry, Drug Delivery, and Therapy Group at VHIR, leading a research line dedicated to the production and characterization of Delivery Systems based on Nanoparticles and Hydrogels for drug delivery. This allowed the establishment of numerous external collaborations with groups interested in applying nanomedicine, contributing to the growth of the research group and its consolidation in the area of Nanomedicine. Consequently, Diana belongs to a solid international network of collaborations, which allowed her to actively participate in almost 30 highly competitive national and international research projects, being PI/WP leader of 9. Due to her pharmaceutical background, during the design of new delivery systems, Diana always took into consideration its industrial scalability and clinical applicability, being the development process projected facing future commercialization and clinical application. Importantly, Diana's research work has secured the obtention of highly competitive national and international grants including the Global Marie Skłodowska-Curie Actions Postdoctoral Fellowship (2023), the La Caixa Junior Leader Grant from La Caixa Foundation (2024), a Research Health Project from the Ministry of Science and Innovation of Spain as Principal Investigator (2024), as well as of other research projects as Principal Investigator or Work Package Leader. Moreover, Diana's research was recognized with a prize from the Spanish Association against Pancreatic Cancer (2023) and was included in the Ranking of Women Researchers of Spain from the High Council of Scientific Research (CSIC), Spain (2025).

Additionally, Diana's research resulted in 2 patents and several important and encouraging results for the scientific community, both in the area of nanoparticles and hydrogels. applied to the treatment of several diseases that were published in highly recognized publications in the field (50 publications, 23 as corresponding author/first/last author, h-index 25, citations 1729).

With her work, she showed that nanoparticles enhance anticancer drug efficacy, improve tumor targeting, reach resistant Cancer Stem Cells, lower systemic toxicity, and enable intracellular delivery of genes and antibodies. In the field of hydrogels, she developed biocompatible thermo-responsive systems, predicted properties using in silico tools, and confirmed in vitro efficacy in cancer models.

Diana also tutored 25 students (4 PhD thesis).

Moreover, since January 2023 Diana is Head of the Nanosystems and in vitro Pre-clinical Validation Sections within the Functional Validation and Preclinical Research (FVPR) platform (ISO9001:2015 certified), and Scientific Coordinator of the Nanbiosis U20 (ICTS).

Also, Diana is highly involved in Open Science Actions, being a member of the RRI Science Education Working group of VHIR, participating in the organization of numerous dissemination activities for citizens. Importantly, Diana also acts as Peer Reviewer for several indexed scientific journals, national and international grants, as well as scientific associations. Overall, at this point in her career, Diana possesses scientific independence, and the leadership and scientific capabilities required to guarantee the successful execution of her research projects.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: MARTINEZ ORDOÑEZ, ANXO
Referencia: RYC2025-054712-I
Correo Electrónico: anx1991@hotmail.com
Título: Microenvironmental Regulation of Cancer Progression: Mechanisms and Therapeutic Discovery
Resumen de la Memoria:

I am a cancer biologist focused on understanding how epithelial plasticity and tumor-microenvironment interactions drive cancer initiation, progression, and therapeutic resistance. Since beginning my PhD in 2014, I have built a trajectory that integrates mechanistic discovery with translational innovation, resulting in new conceptual frameworks and therapeutic insights. My research combines molecular biology, organoid and in vivo models, imaging, and single-cell and spatial transcriptomics to dissect how local ecosystems regulate tumor evolution.

Major scientific achievements include:

1. Breast cancer: As first author in *Oncogene*, 2018 and 2021, and *The Journal of Pathology*, 2019, I revealed that POU1F1 promotes metastasis by coordinating CXCL12/CXCR4-driven chemotaxis and LDHA-dependent metabolic rewiring, uncovering mechanisms relevant to tumor-stroma communication.

2. Colorectal cancer (CRC): As first author in *Cancer Cell*, 2023, I demonstrated that atypical PKC loss generates mesenchymal, immune-excluded CRC through stromal hyaluronan (HA) accumulation and interferon suppression. I showed that HA depletion restores antitumor immunity and sensitizes tumors to PD-L1 blockade, resulting in a patent application and informing ongoing preclinical exploration.

3. Metaplastic evolution in CRC: Using single-cell and spatial technologies, I discovered fetal-like metaplastic epithelial states (TFMCs) that emerge early in serrated tumorigenesis. I also identified an aPKC-ANXA10-SREBP2 axis controlling cholesterol biosynthesis and plasticity, work published as first author in *Developmental Cell*, 2024, and co-author in *Nature Communications*, 2023, respectively.

Together, these contributions reflect my expertise in tumor plasticity, stromal remodeling, and spatial/single-cell analysis. I have also developed methodologies widely adopted by other groups, including protocols for imaging intact organoids, co-culturing organoids with fibroblasts, and profiling tumors in vivo, disseminated through two STAR Protocols, 2023 and 2024.

Building on these achievements, the RyC project defines an independent research line distinct from my mentors' work: a shift from stromal-driven mechanisms to microbe-driven carcinogenesis, specifically how *H. pylori* infection remodels epithelial and microenvironmental states to initiate gastric transformation. I will build on my preliminary integration of public datasets to generate a comprehensive single-cell atlas of the gastric mucosa, map infection-induced trajectories, and validate mechanistic pathways in spatial and organoid systems. This positions microbial cues as actionable regulators of early tumorigenesis, a conceptual and translational direction developed uniquely under my leadership.

Strategically, this project will position me for ERC Starting Grant applications, engagement with European Cancer Mission efforts, and collaborations with microbiome and cancer consortia. My experience mentoring students, coordinating multidisciplinary teams, and co-supervising grants supports my readiness to lead an independent group.

This proposal consolidates a trajectory of mechanistic insight, microbial and microenvironmental biology, and therapeutic innovation, establishing a sustainable and competitive research line in microbiology-driven carcinogenesis with high potential for scientific and clinical impact.

Resumen del Currículum Vitae:

Achievements

I have authored 19 publications (17 research articles, 2 reviews), including 5 first/co-first author papers and 2 co-corresponding STAR Protocols in high-impact Q1 journals such as *Cancer Cell*, *Molecular Cell*, *Nature Communications*, *Developmental Cell* and *Oncogene*. My work has 756 citations, with an h-index of 13 and an i10-index of 14 (Google Scholar, Dec 2025). I have presented my research at national and international meetings, including oral communications at Weill Cornell Medicine (2023) and Sanford Burnham Prebys (2018), and posters at Keystone Symposia (Florence, 2019), EACR (Berlin, 2017) and the NCRI Cancer Conference (Liverpool, 2014). My methodological contributions, protocols for imaging intact organoids, organoid-fibroblast coculture, and in vivo tumor profiling, are disseminated through two STAR Protocols and used by multiple laboratories. My research uncovered mechanisms of POU1F1-driven metastasis, HA-dependent immune exclusion, fetal-like metaplastic states, and cholesterol reprogramming, and contributed to a patented therapeutic strategy for low-aPKC colorectal tumors.

Internationalization

My training spans competitive institutions in Spain and the United States. After graduating in Biology and completing an MSc in Biomedical Research at the University of Santiago de Compostela, I secured over 130,000 euros in national predoctoral fellowships (Xunta de Galicia; FPU). I completed my PhD with international distinction (Sobresaliente Cum Laude), evaluated by an external international committee. During my PhD, I conducted an FPU-funded research stay at Sanford Burnham Prebys (San Diego, USA), gaining experience in 3D coculture systems, metabolic assays and omics approaches. Since 2020, I have worked at Weill Cornell Medicine (New York, USA), progressing from Postdoctoral Associate to Research Associate in February 2025, integrating multiplex imaging, organoid and in vivo models, and single-cell and spatial transcriptomics in NIH-funded colorectal cancer projects.

Leadership

I have progressively assumed leadership and scientific independence, guiding key experimental and analytical components of multidisciplinary projects, including work identifying hyaluronan depletion as a therapeutic vulnerability in mesenchymal colorectal cancer and defining early stem-cell loss in colorectal tumor initiation. I have contributed to 9 competitive R&D projects, including 4 major NIH/NCI R01 grants collectively exceeding 6 million dollars, driving essential experimental, computational and validation workflows involving organoid models, stromal remodeling and single-cell/spatial technologies. I have supervised undergraduate, Master's and PhD students; coordinated collaborations between pathology, imaging and computational teams; and contributed to grant writing and manuscript preparation. Through my FPU fellowship, I completed 135 hours of accredited teaching in physiology across multiple degrees (2016-2019). I also serve as reviewer for journals such as *Cancers*, *Cells* and *STAR Protocols*, evaluator



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

of PhD theses and panel member in regional fellowship calls. My work has been highlighted in an invited outreach article for Springer Nature Communities and in national/international media. Together, these achievements demonstrate my capacity to lead an independent research program.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Biomedicina

Nombre:

DOMINGUEZ ITURZA, NURIA

Referencia:

RYC2025-054704-I

Correo Electrónico:

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Título:

Neuron Glia Interactions Regulating Cortical Myelination in Health and Disease

Resumen de la Memoria:

I am a senior postdoctoral researcher at Harvard University with over 14 years of research experience in neuroscience, including 11 years of international training across Belgium, Switzerland, Italy, and the United States. Since my early years as a student, I have been fascinated by how the brain develops and functions, and how its disruption leads to neurodevelopmental disorders.

Cerebral cortex development is essential for sensory and cognitive functions, with myelination playing a central role. Myelin, a lipid-rich membrane produced by oligodendrocytes, insulates axons and enables fast and efficient signal transmission. Disruptions in cortical myelination contributes to neurological disorders such as autism spectrum disorder (ASD) and schizophrenia (SCZ). During my PhD, I contributed to this emerging field by showing that the *Cyfp1* heterozygous mouse model of ASD and SCZ exhibits myelination and white matter abnormalities which could underlay the connectivity and behavioral alterations found in mice and individuals with ASD and SCZ (Domínguez-Iturza et al., 2019, NatComm). These discoveries motivated my interest in the mechanisms governing axonal development and myelination in neurodevelopmental disorders. During my first, one-year postdoc, my research aimed to uncover the role of CYFIP1 in axonal development. In this work we discovered that CYFIP1 controls cortical axonal growth through the regulation of intracellular calcium (Ricci et al, 2025, NatComm; co-senior author).

These discoveries further deepened my curiosity about how axons and myelin develop. Contrary to previous assumptions, axonal myelination in the cerebral cortex is highly heterogeneous across and within neuronal types. In my postdoctoral work I decided to investigate not only neurons but also how their interactions with oligodendrocytes shape distinct myelin profiles. During my work, I identified neuron class-associated molecular signals that promote differential myelination across cortical layers (Jokhi*, Domínguez-Iturza*, Kim*, et al., Neuron, in revision; see bioRxiv). However, the local molecular mechanisms guiding the specific distribution of myelin along individual axons remain unknown, leaving this fundamental and fascinating question unanswered.

My research program aims to identify neuronal signals that guide myelin distribution along axons, elucidate their role in myelin development and maintenance, and determine how their disruption contributes to neurodevelopmental disorders. To this end my lab will: 1) Uncover the axonal molecular signals that control intermittent myelination across projection neuron types and stages; 2) Identify axonal proteins that contribute to myelin defects in neurodevelopmental disorders.

This line of research uniquely integrates the expertise I developed during my PhD and postdoctoral training to investigate myelination and its disruption in neurodevelopmental disorders from the perspective of cortical development, introducing a novel direction in the field.

Resumen del Currículum Vitae:

Over the past 14 years, my research focused on the mechanisms shaping brain development and their dysregulation in disease. I have trained at leading institutions across Spain, Belgium, Switzerland, Italy, and the United States, focusing first on neuronal development, and later expanding my research to neuron-glia interactions, particularly those driving myelination. As an independent investigator, my goal is to integrate my expertise in cortical development, myelination, and neurodevelopmental disorders to investigate the interplay between neurons and oligodendrocytes, and how its dysregulation contributes to neurodevelopmental diseases.

My scientific journey has uniquely prepared me for this next step. During my master's studies at CIBIR in Dr. Miguel Morales's lab I studied dendritic spine formation and pruning in the context of Alzheimer's and Huntington's disease, leading to three publications, including one as first author (Neural Plast., Front. Mol. Neurosci., J. Clin. Invest.). In 2013, I joined Prof. Claudia Bagni's laboratory at KU Leuven for my PhD, where I studied cortical development and brain wiring in neurodevelopmental disorders, resulting in two first/co-first author publications (Nat. Neurosci., Nat. Commun.), as well as a review (Curr. Opin. Neurobiol.), and a commentary (Cell). In 2020 I started a 1-year postdoc at the University of Rome, where I investigated how energy metabolism shapes axonal development in neurodevelopmental disorders, work recently published in Nature Communications, where I am co-senior and co-corresponding author.

After this period, I opted to broaden my research perspective by studying not only the neurons themselves but also exploring the interactions between neurons and glial cells and their role in forming complex brain circuits. In 2022, I joined Prof. Paola Arlotta's laboratory at Harvard University, where I study the molecular mechanisms that regulate neuron-oligodendrocyte communication during cortical myelination. This work is available on bioRxiv and under final revision at Neuron. I also first-authored a review on cortical development published in Neuron and contributed to several collaborative studies.

I have secured independent funding throughout all stages of my career, including a PhD fellowship from the Research Foundation Flanders (FWO, Belgium), a postdoctoral fellowship at the University of Rome (Italy), and the senior Charles A. King Trust Postdoctoral Fellowship (USA) supporting my transition to independence. I have presented my research at major international conferences, including oral presentations at CSHL, EMBO, ISN and GRC (total 8 oral presentation and 14 posters). I have also supervised junior researchers and directed students' theses at multiple career stages (master's, PhD). I also taught an undergraduate course in cellular and molecular biology at Harvard University and served as a reviewer for leading neuroscience and interdisciplinary journals.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

My ability to secure funding, foster collaborations, and mentor trainees, combined with a strong publication record, has prepared me to transition to an independent position and establish my own research program.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: HUERGA ENCABO, HECTOR
Referencia: RYC2025-055309-I
Correo Electrónico: hector_huerga@hotmail.com
Título: Impact of clonal haematopoiesis on the immune response and disease consequences
Resumen de la Memoria:

My scientific career has been shaped by collaboration, multidisciplinary work and commitment to open science. I began my research journey abroad in Naples, completing a 7-month placement at the Stazione Zoologica Anton Dohrn. This early exposure to evolutionary and developmental biology strengthened my appreciation for fundamental research. In 2013, I received two PhD fellowships to join Cristina López-Rodríguez's group at Pompeu Fabra University. My doctoral work uncovered a new mechanism regulating the type I interferon response and its effect on viral response and hematopoietic stem cells (HSCs) activation (JEM, 2019). I also contributed to multiple collaborations and received the UPF Extraordinary PhD Award in 2019.

Seeking deeper expertise in human haematopoiesis, I applied for a postdoc position at the Francis Crick Institute in London to join Dominique Bonnet's lab, a scientific leader in the field of HSC biology. During my postdoc I studied how stress signals regulate human HSCs and promote clonal haematopoiesis. Also, during my postdoctoral years I benefit from the Crick Institute infrastructure and connections to collaborate with many scientific leaders and international teams.

Beyond research, I actively promote equity and open science. I joined the Athena Swan to learn how to address equity in science and I was an active member of the Postdoc committee, organising the annual postdoc symposium among other outreach activities. I am especially proud to have founded FlowAfrica, an initiative within TReND in Africa that provides flow cytometry training and equipment to institutions in Nigeria and Cameroon. I have demonstrated scientific independence through competitive funding success at every career stage and through sustained leadership in research, mentoring, and community initiatives. Together, these experiences highlight my ability to lead teams, manage complex projects, and foster collaborative, inclusive scientific environments; skills I will continue to apply as group leader at the CaixaResearch Institute.

My research proposal focuses on two major aims. First, to unravel the molecular and functional consequences of common clonal haematopoiesis (CH) mutations within the human immune system. The second aim is to discover innovative therapeutic targets that could lower the risk of CH carriers developing blood cancers or immune-related conditions, including cardiovascular and pulmonary inflammatory diseases. This work will deepen our fundamental understanding of how somatic mutations arising in the stem cell compartment shape the immune lineage. Ultimately, these insights will guide the development of more effective therapeutic strategies for CH-associated immune disorders.

Resumen del Currículum Vitae:

Following my early interest in human disease, I studied Biology during my BSc at the University of Barcelona where I also obtained different undergraduate fellowships to start my training and gain research experience. During these initial fellowships, working in the field of evolution and development, I recognized the importance of fundamental research and this served to guide my research career. After graduating, I decided to use my Master of Science (MSc) placement to gain experience in clinical research working at the Vall d'Hebron Research Institute. In 2013, I was awarded two PhD fellowships to join Prof. Cristina Lopez-Rodriguez group at the Pompeu Fabra University in Barcelona. My doctoral studies focused on the innate immune response to pathogens and more specifically the regulation of the antiviral response. We described a novel mechanism to fine-tune activation of the IFN-I response, and its impact on HSCs and viral infection. This work was published in JEM (2020). I additionally received the Doctoral-School-PhD Extraordinary Award from the University Pompeu Fabra for the best PhD thesis.

To broaden my knowledge on how our body and the haematopoietic system respond to immune threats, I applied for a postdoctoral position in the lab of Dominique Bonnet, a scientific leader in the hematology field, and was recruited in 2019. After one year at the Francis Crick Institute, I joined the Crick-Covid-19 Consortium to help setting up a testing facility at the Crick, leading to relevant publications (Nature Biotechnology, 2020 and Lancet, 2020). I also took an active role in starting and leading a Covid19 research project in the Bonnet lab that resulted in the findings of how SARS-CoV-2 is able to infect specific subsets of red blood cells (Stem Cell Reports, 2021 and STAR Protocols, 2021). I received the Kay Kendall Leukaemia Foundation postdoctoral fellowship that allowed me to develop and publish three main research projects as first author. In brief, regarding TET2-derived clonal hematopoiesis we uncovered that TET2Mut HSCs are refractory to immune activation and become resistant to environments triggering myelopoiesis (Blood Cancer Discovery, 2025); and influence human neutrophil development and function (Cell Stem Cell, 2023). Regarding DNMT3A, we characterized how frequent blood donation in humans could favor non-malignant DNMT3A-derived clonal haematopoiesis via erythropoietin (EPO) mediated mechanisms (Blood, 2025).

My research identity is a well-designed culmination of my interests from my PhD work where I studied innate immune cells and the response to pathogens and my current interest in human clonal haematopoiesis and the development of clinical symptoms in individuals with this condition. Beyond my research identity, during my postdoc I joined the Athena Swan Steering group to address equality in research institutes. More importantly, I am proud of have founded the FlowAfrica initiative. The objective is to bring flow cytometry to research institutes in Africa by setting up new flow cytometry facilities and providing access to online training. Over the last two years, thanks to European Hematology Association (EHA) and Cancer Research UK (CRUK) funding I start pursuing my independent ideas. Finally, on December 2025 I am joining the new CaixaResearch Institute as Junior Group Leader.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: SAUER, CAROLIN MARGARETHE
Referencia: RYC2025-054823-I
Correo Electrónico: carolinm.sauer@gmail.com
Título: Decoding molecular signatures of cell-free DNA to transform cancer detection and monitoring for clinical decision making

Resumen de la Memoria:

Cancer remains a leading cause of mortality worldwide, highlighting the need for improved strategies in early detection and disease monitoring. Analysis of cell-free DNA (cfDNA) from liquid biopsies has transformed oncology by enabling minimally invasive assessment of tumour burden and comprehensive genomic profiling. A major application has been multi-cancer early detection (MCEd) assays. Although encouraging, current MCEd efforts are hampered by elevated false-positive rates and limited specificity, and it remains yet unresolved whether MCEd screening reduces cancer mortality or primarily extends lead time. Beyond MCEd, liquid biopsy technologies are underutilised in key areas with significant unmet need, including detection of minimal residual disease (MRD), early relapse surveillance, prediction of therapeutic response, and real-time monitoring of clonal evolution under therapeutic pressure. Nevertheless, despite the strong potential of liquid biopsies, current sequencing approaches still face constraints in sensitivity, specificity, cost, and turnaround time, limiting clinical impact.

This research program aims to overcome these barriers by integrating state-of-the-art sequencing with advanced computational modelling and experimental approaches to fully leverage the biological information encoded in cfDNA. Specifically, it will capitalise on patient derived xenograft (PDX) modelling and long-read sequencing to reveal previously inaccessible cfDNA features, and fuse multiple molecular dimensions (e.g. genomic alterations, methylation states, and fragmentomic patterns) into comprehensive models of tumour dynamics using machine learning and AI. The primary objectives are to: 1) exploit tumour biology to develop novel blood-based biomarkers, 2) harness methylation signals to predict treatment response and toxicities, and 3) enhance patient experience through innovative approaches to liquid biopsy sampling and analysis.

The project is structured to deliver both fundamental insights and translational value. At the scientific level, it will elucidate new aspects of cancer biology and establish cfDNA as a dynamic readout of tumour ecosystems. Clinically, it will define frameworks for cfDNA-guided monitoring that are more sensitive, scalable, and cost-efficient than current practice.

Beyond its scientific goals, this programme will underpin my transition to independence by establishing the foundations for a dedicated research team. My long-term vision is to make liquid biopsies central to precision oncology, enabling earlier intervention, more adaptive treatment, and measurably improved patient outcomes.

Resumen del Currículum Vitae:

I am a highly driven computational cancer researcher with extensive wet lab training. My research journey to date has been shaped by a continuous drive to translate genomic discoveries into clinically meaningful advancements.

Originally from Germany, I completed my BSc (Hons) Biology in Manchester, where I graduated top of my class while already working full-time in a research group. Subsequently, I obtained a competitive Cancer Research UK (CRUK) PhD Fellowship to pursue my PhD at the CRUK Cambridge Institute, University of Cambridge. My research focused on genomic instability in high-grade serous ovarian cancer, where I explored centrosome abnormalities as drivers of chromosomal instability and contributed to patient-derived xenograft (PDX) and liquid biopsy based studies. My thesis was nominated for the Milo Keynes Thesis Prize at the School of Clinical Medicine, received a DRA Honourable Mention Award, and laid the foundation for my long-term interest in liquid biopsies and clinically impactful cancer genomics.

Since April 2022, I have been a postdoctoral fellow in Dr Cortés-Ciriano's Cancer Genomics group at EMBL-EBI, supported by a prestigious Marie Skłodowska-Curie Actions Postdoctoral Fellowship. My research here focusses on developing computational frameworks and experimental approaches for advancing long-read sequencing in cancer, both from tumour tissues and liquid biopsies. I co-developed SAVANA, a widely adopted algorithm for the joint analysis of somatic structural variants, copy number changes, tumour purity, and ploidy from long-read sequencing. In parallel, I have led large-scale efforts in liquid biopsy analysis within the UK-wide Stratified Medicine Paediatrics study, where I developed new experimental methods for cfDNA analysis using Nanopore sequencing (patent filed in 2024) and novel computational approaches for integrating tumour signals across >1000 cfDNA samples, the largest Nanopore cfDNA study to date.

Beyond my research, I have been proactive in training, mentorship, and scientific leadership. I currently hold a Bye-Fellow position as College Teaching Associate at Downing College, University of Cambridge, am a Lead Trainer at the Bioinformatics Training Facility, and a Postdoctoral Affiliate at Newnham College. Over the past years, I have successfully taught and supervised numerous students, helping to train the next generation of scientists. I have disseminated my work widely as an invited speaker at international conferences, and my research has been recognised with fellowships, awards, and leadership opportunities, including my selection for the LEAP leadership programme. To date, I have co-authored >18 publications, including five as first or co-first author, spanning high-impact journals in genomics, methods, and translational oncology. My main ambition now is to establish myself as an independent group leader in translational cancer genomics, with an overarching goal of improving cancer care and patient outcomes.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Referencia: RYC2025-054363-I
Correo Electrónico: jpo.cardio@gmail.com
Título: Quantitative Cardiogenomics in Inherited Cardiac Diseases: Intermediate-Effect Variants and the Continuum of Genetic Risk

Resumen de la Memoria:

My research line addresses a central unmet need in cardiovascular genetics: explaining the missing heritability and variable expressivity of inherited cardiomyopathies. Over the last decade, my trajectory has evolved from the identification of novel disease genes to the development of a quantitative genetic framework—the Intermediate-Effect Variant (IEV) model—that redefines inheritance as a probabilistic continuum rather than a binary categorical system.

1. Clinical Foundation and Gene Discovery (2014–2020): My early career combined clinical cardiology with genomic research (INIBIC/UDC), leading to the identification of FHOD3 as a major cause of hypertrophic cardiomyopathy (HCM) (JACC 2018, 1st/corr). I also defined the roles of MYZAP, TRIM63, and ALPK3 in recessive and oligogenic cardiomyopathies. These works challenged the "one gene, one disease" dogma and highlighted the role of dosage-dependent effects.

2. Methodological Innovation and the IEV Framework (2020–2024): Recognizing that binary classification fails to capture moderate-risk alleles, I developed quantitative methods to estimate penetrance and effect size. This phase was catalyzed by my role as Scientific Director at Health in Code, where I applied these models to >30,000 genomes. This "industrial-scale" validation allowed me to formalize the IEV framework (Circulation 2025, Senior/Corr), demonstrating that variants in the "grey zone" explain ~5-10% of missing heritability in HCM.

3. Independence and Consolidation at CNIC (2024–Present): I have established an independent line at CNIC, integrating three layers:
(a) Quantitative Genomics: harmonization of large-scale cohorts (DCM-Next, UK Biobank) to map the IEV landscape in dilated cardiomyopathy (DCM);
(b) Functional Validation: use of CRISPR-edited iPSC-cardiomyocytes to prove that IEVs cause dosage-dependent molecular dysfunction (Circulation 2023, Circ Res 2023);
(c) Clinical Translation: development of prognostic algorithms and biomarkers (European Patent EP25383148).

Internationalization and Leadership: My profile is defined by cross-sectoral mobility (Academy-Industry-Academy) and international integration. I co-lead the Genomics WP of the Horizon Europe DCM-Next Consortium and contribute to ClinGen expert panels. I have secured competitive funding as PI (OLIGENE-HCM, MYZAP-Mechanisms, CardioAging-WP), managing a total budget >€330k.

Strategic Impact & Transfer: This research transcends academic boundaries; it directly addresses the inefficiency of inconclusive genetic testing in the National Health System. By operationalizing the Q-IEV Atlas and leveraging my recent European Patent for amyloidosis biomarkers, this line will increase diagnostic yields and reduce healthcare costs. My goal is to position CNIC as a global node for quantitative precision medicine, aligning with the Spanish Strategy for Personalized Medicine.

Future Vision: The RyC fellowship will allow me to consolidate the "Quantitative Cardiogenomics" group at CNIC. My objective is to scale the IEV model from HCM to DCM and heart failure, creating the "Q-IEV Atlas"—an interoperable European resource for probabilistic variant interpretation. This line bridges the gap between Mendelian genetics and complex traits, positioning Spain as a reference node for the next generation of precision cardiology.

Resumen del Currículum Vitae:

1. Scientific Production and Impact: As of 2025, I have authored 106 publications in top-tier cardiovascular and genetics journals, with an H-index of 21 and over 2,000 citations (WOS). My work shows a consistent upward trajectory in quality and leadership, substantially contributing to defining the genetic architecture of inherited cardiomyopathies:

-15 papers as First, Senior, or Corresponding Author in D1 journals including Circulation, JACC, JAMA Cardiology, EHJ, and Circ Heart Fail.
-Key contributions: Circulation 2025 (Senior/Corr; seminal definition of the IEV framework), JACC 2018 (1st/Corr; FHOD3 discovery), J Med Genet 2024 (Senior; dosage effects), JACC:EP 2024 (1st; conduction disease).
-Innovation: Co-inventor of European Patent EP25383148 (2025) for cardiac amyloidosis, demonstrating translational capacity.

2. Research Independence and Funding: capacity to secure and manage competitive funding independently of my host institutions (>€330k direct management):

-Principal Investigator (PI): OLIGENE-HCM (BMS, €110k, 2022-24, investigating low-penetrance variants) and MYZAP Mechanisms (SEC, €15k, 2021-22, translational study).
-Work Package Leader: CardioAging (PLEC2022, WP budget €211k, 2022-25), leading the development of somatic-mutation-based HFpEF clinical prediction panels.
-Consortium Leadership: Co-Lead of the Genomics WP in the Horizon Europe DCM-Next Consortium (€4.5M total budget), coordinating genomic data integration and variant interpretation.

3. Leadership, Mentoring and Transfer:



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

-PhD Supervision: I supervise 3 PhD theses (UDC) and co-supervise 1 (UFV). My mentoring strategy drives high-impact output: my student S. García-Hernández is the First Author of the Circulation 2025 paper, and J.M. Larrañaga is First Author of JACC: Heart Failure 2025. This confirms my ability to train researchers who publish in D1 journals during their training.

-Management & Transfer: Former Head of the Cardiovascular Genetics Program at Health in Code (2021-2024). I led a multidisciplinary team of geneticists and bioinformaticians, managing data governance. I oversaw ISO-accredited pipelines/algorithms for >30,000 patients later used in >50 Spanish hospitals.

-Scientific Independence: My senior authorship demonstrates full intellectual ownership, distinct from former supervisors.

4. Internationalization and Mobility:

-Geographical: MD/Residency in Argentina -> PhD in Spain (UDC/INIBIC) -> Research Stay at UCL (UK) -> Postdoc at Puerta de Hierro -> CNIC.

-Sectoral: Successful transition between public research (CNIC, IDIPHIM) and private sector R&D, maintaining high academic output (visiting scientist) at CNIC during industry tenure.

-Networking: Active member of ClinGen (Clinical Genome Resource) Expert Panels and invited speaker at major congresses (ESC, HRS, SEC).

5. Teaching and Evaluation:

-Expert evaluator for the European Commission (Horizon Europe) and the British Heart Foundation (UK), and Spanish Society of Cardiology (SEC).

-Director of the "Bootcamp on CV Genetic Interpretation" (Htal. Bellvitge/UAB).

-Regular lecturer at ESC, HRS, and SEC meetings.

6. Summary: My CV reflects a mature, independent Scientist-Physician profile with a unique ability to integrate big-data genomics, experimental validation, and clinical care. Supported by sustained funding, high-impact production, and a proven capacity to mentor.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: ANGUITA RUIZ, AUGUSTO
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Título: Integrating Exposomics into Biomedicine: Computational Frameworks for Multi-omic Biomarker Discovery in Childhood Obesity

Resumen de la Memoria:

I am a molecular epidemiologist and data scientist specialising in exposome, multi-omics and eXplainable Artificial Intelligence (XAI). I trained as a biochemist and bioinformatician at the University of Granada (i-PFIS PhD, Extraordinary Award), where I first linked molecular biomarkers to insulin resistance in children with obesity. Since 2021, I have developed my postdoctoral and early independent career at ISGlobal, complemented by research stays at Imperial College London (8 months) and INSERM Grenoble (12 months), which consolidated my expertise in advanced methods for exposome and multi-omics integration. This trajectory has led to my current position as Junior Group Leader at ISGlobal and PI of a translational research programme supported by >550,000€ in competitive funding as principal investigator.

A central question in my work is why some children with obesity develop early cardiometabolic complications while others remain metabolically healthy. I have a hybrid profile: unlike traditional epidemiologists, I design and implement my own analytical and AI pipelines; unlike pure data scientists, I lead the biological interpretation and clinical translation of the findings. This is reflected in 45 JCR articles that combine high-impact biomarker, methodological and digital-health contributions. Key outputs include multi-omics architectures of childhood obesity and metabolic dysfunction (Nature Communications), discovery of protein and epigenetic markers of insulin resistance (Metabolism, Cardiovascular Diabetology), methodological advances on explainable AI and exposome statistics (Environment International, Environmental Science & Technology, Computers in Biology and Medicine), and clinically oriented tools such as an explainable clinical decision support system for insulin resistance (Artificial Intelligence in Medicine) and the ObMetrics web application for metabolic syndrome assessment (Pediatric Obesity). Together, these studies have defined early molecular signatures of cardiometabolic dysfunction, provided reference guidelines for exposome analysis and generated concrete eHealth tools.

During the Ramón y Cajal contract, I aim to consolidate an independent research line that links early-life exposome, multi-omics and explainable AI to understand when, how and for whom early-life environments accelerate cardiometabolic deterioration, and how this knowledge can be turned into usable digital tools. First, I will deepen the analysis of early-life environmental determinants of metabolic trajectories in paediatric obesity, integrating omics, lifestyle, urban and chemical exposures in Spanish cohorts within my national FIS-ISCIII project EXOMAIR (PI23/01032). Second, through CITIES-on-the-CLOCK, a new proposal on adolescent obesity and urban environments, I will move towards dynamic, city-level exposomes and multi-omic ageing clocks informed by smartphone-based mobility data, identifying modifiable urban and behavioural factors. Third, building on GenAI4FAIR, a Horizon Europe proposal that I lead as ISGlobal PI, I will develop and validate GenAI-enabled assistants that democratise access to complex exposome and omics data for clinicians and non-technical researchers, embedding trustworthy, explainable AI within European research infrastructures and strengthening Spain's position in translational exposome research in child health.

Resumen del Currículum Vitae:

I am a Junior Group Leader at the Barcelona Institute for Global Health (ISGlobal) (Severo Ochoa Centre of Excellence) and Principal Investigator of a "La Caixa" Junior Leader Retaining Fellowship (320,100€). I manage a total portfolio of 550,000€ in active funding as PI, leading a translational research line that integrates molecular epidemiology, exposome science, and eXplainable AI (XAI) to unravel early-life determinants of pediatric metabolic disease and obesity. In addition to the "La Caixa" grant, I lead the National ISCIII-FIS project EXOMAIR (PI23/01032, 139,375€), a CaixaResearch Innovation grant (23,099€) for market transfer, and multiple private R&D contracts with IdISBa (54,522€) and IDIBGI (13,534€).

My scientific track record includes 45 JCR articles (18 D1, 21 Q1), accumulating >1,150 citations (h-index: 18, i10-index: 28). My authorship profile reflects a complete transition to leadership: 18 as First Author and 3 as Senior/Last Author. Some key contributions include: (i) Biomarker Discovery: Identification of multi-omic signatures of pediatric obesity (Nature Communications 2025, IF: 15.7, D1), Discovery of S100A4 as a metabolic risk biomarker (Metabolism 2020, IF: 8.69, D1), and novel blood epigenetic marks for insulin resistance trajectories during adolescence (Cardiovascular Diabetology 2025, IF: 10.6, D1). (ii) Methodological development: Development of statistical methodologies for exposomic analysis (Env. Int. 2023, IF: 11.8, D1, Env. Sci. Tech. 2023, IF: 11.4, D1, Computers In biology and Medicine, IF: 7.7 D1, Senior Author). (iii) Digital Health Transfer: Creation and validation of the ObMetrics clinical eHealth tool (Pediatric Obesity 2025, IF: 2.7, Q1, Senior Author).

I hold a PhD in Biochemistry with Extraordinary Award (Univ. Granada, i-PFIS Fellowship) and have built a strong international profile through academic and industrial mobility: 3 months at INSERM (France) during my PhD, and around four years of postdoctoral experience abroad at ISGlobal (Spain), Imperial College London (UK), and INSERM (France). I play strategic roles in major European consortia, currently serving as Work Package leader in the Horizon Europe IHEN project and co-lead exposome analysis tasks in the H2020 ATHLETE project. I have disseminated my work in more than 58 scientific conferences (around 40 international), including invited keynote talks at SEOM 2025 (Spain), FINUT 2022 (Mexico) and Springer Nature 2019 (London).

I was the Co-founder and CEO of NOVGEN (UGR Spin-off), a company in genetic counselling that received awards such as the "We are enterprise" prize (Popular/PRISA, 2015), Best Health-U Project (Sanofi Aventis, 2015), and the 5th Entrepreneurship Competition (UGR). Currently, I am leveraging this expertise to establish a new Spin-off company for the commercial exploitation of the ObMetrics software, supported by the competitive CaixaResearch Innovation grant I secured as Coordinator. I also demonstrate strong mentoring capacity, currently co-supervising 4 PhD theses (Universities of Granada, Porto, and Barcelona) and have supervised 11 MSc students. Academically, I am an Adjunct Professor at the University of Barcelona (120 teaching hours/year), acting as Subject Coordinator in the MSc of Biomedicine, and a Collaborating Professor at Universitat Oberta de Catalunya.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: NAVARRO MENDOZA, MARÍA ISABEL
Referencia: RYC2025-055868-I
Correo Electrónico: maribel.nm3@gmail.com
Título: Syncytial fungal pathogens as adaptive systems in infection and antifungal drug resistance
Resumen de la Memoria:

My research focuses on emergent fungal pathogens and the molecular mechanisms that allow tissue invasion and adaptation to therapies. Fungal diseases represent a major and underestimated threat to global health, accounting for 6.8% of the total annual deaths worldwide. My work approaches these pathogens from a multidisciplinary angle that combines fungal genetics, epigenetics, host-pathogen interactions, and translational antifungal discovery. This addresses challenges identified by the WHO and aligns with the Horizon Europe Health Cluster.

Throughout my career I have consistently secured competitive funding. My PhD with an FPU fellowship identified new virulence determinants and regulatory networks in fungi. These studies produced first-author papers in mBio, PLoS Genetics, and Scientific Reports. I then led an international effort that discovered a novel centromere type in early diverging fungi, published in Current Biology, receiving the Fleming Award by SEM.

My four-year postdoctoral work at Duke University marked a turning point toward independence. Supported by a Margarita Salas fellowship and NIH grants, I developed a research line on RNA and chromatin regulation of antifungal drug resistance. I led an NIH R01 and published first and corresponding author works in Nature Communications (2025) and PNAS (2023). I expanded into translational research through collaborations with two pharmaceutical companies, as co-PI of translational projects that identified mechanisms of antifungal resistance and publishing as first and corresponding author in mBio (2024). I acted as lead researcher in four NIH projects and participated in eight competitive grants totaling over \$12,600,000 and €426,000. These achievements underline my capacity to lead projects that bridge mechanistic biology with clinical relevance. My contributions were recognized with the 2025 Young Investigator Award from the European Confederation of Medical Mycology.

In 2025, I joined the Universidad Miguel Hernández as Assistant Professor and researcher at ISABIAL. My line of research focuses on syncytial Mucorales fungi and how nuclear and epigenetic heterogeneity drives virulence, tissue invasion, and antifungal resistance. I aim to establish a conceptual framework that explains how these multinucleated pathogens organize gene regulation and adaptation inside the host. I will apply single-cell omics strategies and advanced infection models, including organoid systems.

My international network includes collaborations with leaders in fungal genetics, immunology, and microbiology. I organize the Symposium on the Basal Fungal Kingdom at major Fungal Genetics conferences (2023 Austria, 2024 California, 2025 Dublin, 2027 Helsinki), reinforcing my leadership in the field. I maintain strong engagement in education and mentorship, supervising undergraduate, master, and PhD students, and I contribute to numerous outreach and science communication activities, including hosting a radio program. I am strongly committed to combat discrimination and bias through outreach, science communication and active participation in the Duke DEI committee.

My internationalization and leadership together with my ANECA accreditation as Profesora Contratada Doctora position me for a Ramón y Cajal career. My recent ERC Starting Grant application shows my motivation to build a competitive research line.

Resumen del Currículum Vitae:

My scientific career has developed through competitive achievements, international experience, and leadership in fungal genetics, epigenetics, and infectious diseases. I began my trajectory through a Beca Colaboración, a four-year FPU fellowship, and an FPU mobility stay at Duke University. These provided solid training in molecular biology, microbiology, and genetics and supported my early publications as a first author on virulence and genome regulation in Current Biology, PLOS Pathogens, PLOS Genetics, mBio, and Scientific Reports.

I then advanced through major postdoctoral programs and sustained competitive funding in a top-ranked institution in the United States with Prof. Joseph Heitman, completing a four-year postdoctoral stage at Duke University. I obtained the Margarita Salas fellowship to join Duke University, where I led an NIH grant on epigenetics and antifungal resistance. I have participated in eight competitive public projects and two translational contracts, with a combined budget exceeding \$12,600,000 and €426,000 from American and Spanish agencies. I am also a co-PI in a pharmaceutical project, which strengthened my ability to link mechanistic biology with antifungal discovery.

I have authored 23 publications, including first and corresponding author in two Nature Communications papers, one PNAS paper, and one mBio paper. My production includes 9 first-author and 3 corresponding-author papers, 2 book chapters, 870 citations, and an h-index of 15, reflecting sustained scientific independence and impact in fungal genetics and medical mycology.

My scientific excellence has been recognized through several awards, including the 2025 European Confederation of Medical Mycology Young Investigator Award, the 2020 Fleming Award from the Spanish Society for Microbiology, and the Premio Extraordinario de Doctorado. I also received travel awards to attend international conferences. I have delivered 14 oral presentations at international conferences and 9 at national meetings, including invited seminars at Duke University, Dartmouth University, IDiBE, and the XII Mycological Forum. I also gave the closure plenary talk at the XV National Mycology Conference, underscoring the international recognition of my work.

My leadership extends across academic, scientific, and community activities. I obtained the ANECA accreditation as Profesora Contratada Doctora and currently serve as Assistant Professor at the Universidad Miguel Hernández, contributing to teaching Microbiology and Genetics with more than 400



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

hours. I have co-directed 5 TFG at UMU and UMH and 1 Muser thesis at Duke. I supervised undergraduate and PhD students at Duke, and currently co-direct a PhD, a master student, and 2 TFG students at UMH. I have participated on TFG and PhD committees and contributed to teaching-innovation projects. I am an active reviewer for high-impact journals and a member of several scientific societies.

I maintain a strong commitment to scientific communication and outreach. I organize the Symposium on the Basal Fungal Kingdom at major Fungal Genetics Conferences (Austria 2023, USA 2024, Ireland 2025, Helsinki 2027), co-host a science radio program, and lead initiatives such as the Micromundo project, Biology Week, and PhD communication conferences. I also engage in high-school mentoring and served in the DEI Committee at Duke University.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Título: Hypoxic regulation of inflammation in disease
Resumen de la Memoria:

My scientific trajectory has focused on the study of the effects of oxygen depletion (hypoxia) in disease contexts such as neurodegenerative conditions and acute lung injury. During my pre-doctoral period in Prof. Pascual's lab (Instituto de Biomedicina de Sevilla, Seville), my research centred predominantly on neurodegeneration and, more specifically, on the interplay between hypoxia and Alzheimer's disease (AD). The accumulation and deposition of amyloid-beta peptides is considered by the pathophysiological hypothesis of AD as the driver for subsequent synaptic loss, neuronal death, and dementia. We discarded a direct contribution of hypoxia to amyloid-beta precursor protein generation or pro-amyloidogenic processing in vivo, in contrast to previous studies that had cursed with significant technical limitations. However, we demonstrated a role for hypoxic responses and microglia in non-productive angiogenesis and dysfunctional immunity in AD. These findings led to explore the hypoxia-related protein PHD3, strongly up-regulated via hypoxia-inducible factor signalling in response to amyloid-beta. Our data showed a detrimental role for PHD3 accumulation, which activates anti-viral responses through FOXO3a down-regulation in AD microglia. Importantly, ablation of PHD3 potentiated beneficial microglial activities, such as microglial encapsulation and phagocytosis of amyloid-beta plaques, that linked to improved neuropathology and behavioural defects in mouse models of AD.

The significant evidence, witnessed during my PhD, of the remarkable capacity of hypoxia to modify innate immune responses with implications for disease outcomes, inspired me to further extend this concept during my ongoing post-doctoral period in Prof. Walmsley's lab (Centre for Inflammation Research, Edinburgh). Although I have participated in several projects involving innate immune inflammation (e.g., acute lung injury, diabetes, glioblastoma), my main program of work has focused on the acute and long-term reprogramming of neutrophil biology in response to hypoxia. Hypoxia plays a key role during acute respiratory distress syndrome (ARDS), where it promotes neutrophil-mediated tissue injury. The advent of the COVID-19 pandemic prompted us to characterize the contribution of neutrophils to the inflammation associated to severe cases that progressed into ARDS. We identified a hyperinflammatory and prothrombotic signature that was linked to vascular accidents by concurrent studies. We also showed that ARDS patients experience systemic hypoxia despite receiving oxygen supplementation and display increased susceptibility to infections months after hospital discharge. My subsequent research demonstrated hypoxia-driven chronic neutrophil dysfunction post-ARDS through epigenetic changes in bone marrow progenitors that leads to impaired anti-pathogenic capacity. Notably, we showed how manipulation of the neutrophil epigenetic landscape through vaccination can restore pathogen control.

My future line of research will encompass the main concepts explored during my scientific career with a differential approach i.e., systemic immunity mediated by neutrophils and neurological disease. I believe that my understanding of hypoxia and innate immunity, combined with my background in neurodegenerative disease, places me in a strong position to drive this program of work.

Resumen del Currículum Vitae:

I completed my PhD studies at the University of Seville (2013-2018) with an FPU scholarship following 2 competitive research contracts. I have worked with competitive contracts at the University of Edinburgh (UoE) since 2018. I have contributed to 14 peer-reviewed articles (first or co-first authorship in 4/14), an invited research briefing (Nat Immunol IF=27.7), and a review (Nat Rev Immunol IF=60.9) (all Q1, over 700 citations). I am also a co-corresponding author in a book chapter for CSH Press under editorial revisions.

I also received international conference (Oxford) and neuroinflammation course (Bordeaux) funds during my pre-doctoral period to study the interplay between hypoxia and Alzheimer's disease (AD), alongside other projects (Aging Cell IF=7.1). We discarded a direct pro-amyloidogenic effect of hypoxia (PLoS ONE IF=2.8), but defined associated dysfunctional immunity in AD (Nat Aging IF=19.4, Nat Commun IF=17.7) improved by PHD3 ablation (Sci Adv IF=12.5). During my post-doctoral period, after studying neutrophils in COVID-19 ARDS (Well Open Res IF=4.0), my research focused on hypoxia-mediated neutrophil memory (Nat Immunol IF=27.7) has been independently highlighted (Nat Rev Immunol IF=60.9). I have also co-authored on-site projects at the UoE (Am J Respir Crit Care Med IF=19.3, Well Open Res IF=1.9, Nat Immunol IF=27.6, Cell Metab IF=30.9, J Clin Invest IF=14.8 and a manuscript accepted for publication in Nat Commun IF=15.7), and an external study (Sci Adv IF=15.0). I have disseminated my main results in national and international conferences as 11 posters and 6 oral presentations and competitively secured funds for an extra conference in 2026.

I have established local (University of Seville and Pablo de Olavide) and international (Universities of Edinburgh, Glasgow, Sheffield, Cambridge, Oxford, Dundee, Newcastle and Radboud, Royal Infirmary of Edinburgh, VIB Leuven, and Fred Hutch Cancer Center) links. This included in-person placements in Belgium, Cambridge and within Edinburgh, and arrangement of a visit to assist Dr. Silberstein (US) in 2026. I have developed my research in close coordination with clinical teams, combining translational with basic research, and worked on multiple areas (Drosophila and murine in vivo assays, molecular methods, FACS, histology, microscopy, and in silico processes).

I have translated scientific content for the EuroGCT portal and the UoE, and organized Lab demonstrator sessions for high school pupils and teachers. I have also participated as an invited lecturer at Immunology Summer Schools, in student mentoring, and in exam marking at UoE. I also performed teaching tasks at the University of Seville and have reviewed scientific manuscripts (Q1 journals).

I have supported students and researchers locally and internationally (17 undergrad students, 4 research technicians, 10 PhD students and 8 post-doctoral peers, aiding to secure funds or set up their own lab to 4 of them). I have been a member of interview panels for a PhD candidate and a post-doctoral researcher, co-supervised 3 undergraduate students (TFG equivalent) and I am currently co-supervising a PhD candidate at the UoE. I have played a significant role in 5 competitive funded projects for a combined worth of over 5 million €.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Título: Environmental exposures and human health: an integrative approach including biomarkers, omics, and advanced statistical methods

Resumen de la Memoria:

Dr. Domingo-Relloso is a mathematician with a PhD in biostatistics and a strong background in environmental epidemiology. Her research is focused on the influence of environmental exposures on human health and underlying biological mechanisms, with the uniqueness of a highly multidisciplinary profile. She has published more than 60 papers, many of them in top line medical journals such as JAMA, Nature Communications, Circulation, and Journal of the American College of Cardiology. She has also contributed to the development of four R packages for statistical analysis of biomedical data, which enable the identification of novel biological pathways from the environment to disease.

An important part of her research has focused on understanding the association between metals and chronic diseases, with a special focus on cardiovascular disease (CVD) and Alzheimer's Disease and Related Dementia (ADRD). Her work has shown that metals play a key role as modifiable risk factors for CVD, and have the potential to inform novel approaches for CVD prevention and management. Moreover, her research showed that APOE4 genotype carriers show a stronger association between urinary metals and cognitive decline than non-carriers. This was the first study setting the basis for targeted preventive interventions among those that carry the APOE4 gene and are exposed to metals. She has also worked on evaluating relevant intermediate biological mechanisms underlying the association between environmental exposures and disease. Her research showed that part of the effect of arsenic on CVD might occur through epigenetic changes, including functional validation of the epidemiological results in an experimental mouse model. She was also able to show that gene expression downregulation induced by epigenetic dysregulation is a key intermediate factor on the association between smoking and lung cancer. She has been involved in several international multi-cohort collaborations through a world-wide omics consortium.

Dr. Domingo-Relloso has also worked on the development of statistical methods to facilitate the identification of biological pathways that are associated with human health and disease. Her methods development work has been focused on mediation analysis to evaluate the potential intermediate role of biological mechanisms, the association between high-dimensional exposures (such as omics) with survival outcomes, and causal inference in presence of competing risks, which is essential for research in aging diseases such as ADRD.

She recently started a research line focused on evaluating the effects of microplastics and nanoplastics (MNPs) on human health. In vitro and animal studies have shown that MNPs can potentially induce harmful effects on the cardiovascular system. Yet, no epidemiological studies investigating the effects of MNPs on human health have been conducted. Dr. Domingo-Relloso has been working on the measurement of blood and urine MNPs in a US cohort, and aims to expand the MNPs epidemiological research to Spanish populations. In parallel, she aims to continue her methods development work to extend her causal inference methods to the setting of environmental mixtures, in order to evaluate the effect of the different polymers composing the MNP mixture on health taking into account interactions, non-linear associations and high correlations.

Resumen del Currículum Vitae:

Dr. Domingo-Relloso completed her Bachelor's Degree in Mathematics at the Autonomous University of Madrid, and her Master in Biostatistics at the University of Valencia. During her Master, she conducted two research internships at the Basque Center for Applied Mathematics (Bilbao, Spain) and the Cancer Research Area of the Foundation for the Promotion of Biomedical Research of the Valencian Community (Valencia, Spain). Her Master thesis was awarded the national Almirall award to the best Biostatistics work from the Autonomous University of Barcelona. After working on research projects for a year at INCLIVA Biomedical Research Institute (Valencia, Spain), she moved to New York City to join the Department of Environmental Health Sciences at Columbia University, where she stayed for two years. Then, she obtained the prestigious La Caixa INPhINIT award and conducted a PhD in Biostatistics at the Spanish National Center for Epidemiology (Madrid, Spain) together with the University of Valencia, which she defended with honors (cum laude and International Mention). During her PhD, she conducted two international research internships at the Department of Environmental Health Sciences (Columbia University, New York) and the Department of Bioinformatics (Walter and Eliza Hall Institute of Medical Research, Australia). After completing her PhD, in 2023, she joined the Department of Biostatistics at Columbia University as Associate Research Scientist. In January 2026, she will join IE University School of Science and Technology as Assistant Professor with tenure track.

Dr. Domingo-Relloso has published more than 60 research articles being the first author of 16. Her work has largely focused on evaluating the health effects of environmental exposures on chronic diseases, with a special focus on cardiovascular disease and dementia. She has presented her work in 20 national and international conferences. She has leadership roles in several scientific projects, including the Columbia University Superfund Research program (National Institute of Environmental Health Sciences, USA) and the Water for Health - Improving Cancer Outcomes in Native American Communities project (National Institute on Minority Health and Health Disparities, USA). She has developed several statistical methods for biomedical research in the context of omics data and environmental health, which have been made publicly available through the CRAN repository or through Github.

Dr. Domingo-Relloso has been teaching part of the Dose-response Analysis in Molecular Epidemiology class at the Master of Public Health from Columbia University Mailman School of Public Health for four years, and has been an instructor at several international courses in the US, the Netherlands, Chile and Ethiopia. She is co-founder and editor of the science communication outlet Te lo dice una científica, awarded by the Journalism and Communication in Sustainability Awards from Masorange in 2025. In 2022, she obtained the Rafael del Pino Foundation fellowship FS2S: From Science to Society, translating today's research into tomorrow's solutions. She is an active member of the Environmental Health Working Group of the Spanish Society of Epidemiology, and part of the review panel of the Biology and Medicine of Cancer Prevention call from the Scientific Foundation of the Spanish Association Against Cancer.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Correo Electrónico: sandra.segura-bayona@crick.ac.uk
Título: Decoding mechanisms driving alternative telomere maintenance in cancer

Resumen de la Memoria:

The unifying theme of my research has been centred on dissecting mechanisms of genome maintenance, focused on chromatin and repetitive sequences such as telomeres, and their links to cancer.

I obtained my PhD in 2018 under the supervision of Dr. Travis Stracker at the Institute for Research in Biomedicine (IRB; Barcelona, Spain), with Cum Laude and an Extraordinary Award. During my PhD, I focused on the poorly characterised Touseled-like kinases (TLK1/2), a family of cell cycle regulated kinases that control the histone chaperone ASF1. Using mouse models, I uncovered unique insights on TLK1/2 requirements in mammals and identified an important TLK2-specific role during mouse development while the two kinases were redundant in the maintenance of genome stability. Following the mouse work, I subsequently showed that TLK activity is crucial for proper chromatinization of newly synthesised DNA in cancer cells and unveiled that TLK inactivation potentiates cell killing by checkpoint inhibitors, thus providing a rationale for cancer treatment. I further discovered that TLKs maintain epigenetic silencing of heterochromatin to suppress innate immunity, linking chromatin assembly and immune signalling in cancer. Overall, my work significantly enhanced the knowledge of TLKs on epigenome stability and highlighted their interplay in cancer and neurodevelopmental disorders.

I subsequently joined the laboratory of Prof. Simon Boulton at the Francis Crick Institute (London, UK) as a postdoctoral researcher. During my postdoc, I complemented my previous training by focusing on the molecular mechanisms governing Alternative Lengthening of Telomeres (ALT), a telomerase-independent telomere maintenance pathway active in a significant subset of cancers. I initiated projects to study the roles and genetic suppressors of ATRX, a chromatin remodeller often mutated in ALT tumours. I identified novel ATRX functions in maintaining genome stability at both global and telomeric levels by engineering separation of function mutants. Further, I discovered that loss of SLFN11, a gene frequently silenced in cancer and linked to chemoresistance, drives ALT tolerance in ATRX-deficient cancers. This work suggested that silencing of SLFN11 is selected as means to tolerate endogenous replication stress following ALT activation, leading to intrinsically therapy-resistant tumours. Beyond discovery science, during my postdoc I have pursued translation of mechanistic insights into therapeutics. My research generated a patent on targeting ALT-positive tumours, and I have contributed to the foundation of the spin-out ALT Therapeutics, which exploits these findings.

Overall, my research on mechanisms of genome and telomere stability sets the stage to launch my independent career. My research group will focus on further understanding complex non-canonical mechanisms driving alternative telomere maintenance in cancer, their mechanistic insights and their consequences for cancer genome evolution.

Resumen del Currículum Vitae:

I completed my Biotechnology degree (Universitat Autònoma de Barcelona, Spain, 2011) and MSc in Biomedical Sciences (Utrecht University, the Netherlands, 2013). In 2018, I obtained my PhD from the University of Barcelona, Spain. My PhD work took place at IRB Barcelona, Spain, and was followed by postdoctoral research at the Francis Crick Institute in London, United Kingdom. I have secured independent funding throughout my career, with more than € 400,000 from competitive fellowships, including La Caixa Europe postgraduate MSc Fellowship (2011-2013), "La Caixa" - Severo Ochoa/IRB Barcelona International PhD Fellowship (2013-2017), EMBO Long-Term Fellowship (2020-2021) and Marie Skłodowska-Curie Individual Fellowship (2021-2024). I am also co-applicant in three scientific translation grants awarded since 2022, joint worth € 2,200,000.

My scientific achievements to date are reflected in the diverse nature of both my individual and team-based work within DNA metabolism, chromatin maintenance, genome engineering and genome-wide CRISPR/Cas9 screens in mammalian cells. Overall, my work to date has led to five first-author scientific publications, one first-author review article, with a total number of 23 original peer-reviewed research articles, including two as co-corresponding author. I have been cited 1,346 times so far, with a current h-index of 18 (source: Scopus). Beyond publication metrics, my work reflects three major qualities that strengthen me as a scientist: originality (reflected in the research questions I have pursued), flexibility (showing my work across different disciplines of genome maintenance research) and collaboration (with colleagues in the laboratories I have worked and with external scientists). I have patented part of my findings, contributed to founding ALT Therapeutics, a spin-out where I am shareholder, and worked in translating my work through industry collaborations. I have experience on training early career researchers including supervision of one MSc and one undergraduate student, and co-direction of one PhD thesis. I have delivered >10 invited and conference talks, including at the prestigious EMBO Telomere (2024) and CSHL Telomere (2025) meetings and invited seminars at LUMC in Leiden, NL (2023), Columbia University Rising Star Social DNAing Webinar (2025), CABIMER in Sevilla (2025) and CBMSO in Madrid (2025).

In summary, my track record highlights that I can be a suitable candidate for the prestigious Ramon y Cajal fellowship, which will undoubtedly position me in the path to successfully launch my independent research program.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: DELGADO GONZALEZ, ANTONIO
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Título: Integration of nanotechnology, chemistry, biology and single-cell multiparametric proteomics to profile drug resistance in cancer

Resumen de la Memoria:

El Dr. Delgado-Gonzalez es un investigador multidisciplinar que estudia los mecanismos moleculares de resistencia a fármacos en cáncer, especialmente en cáncer de ovario. Su línea de investigación se centra en estudiar (1) el microambiente tumoral y la respuesta por daño a DNA, y (2) la heterogeneidad clonal en las células tumorales y su reorganización espacial, como principales determinantes de resistencia a fármacos.

Su trayectoria científica se ha centrado en tres áreas principales:

1. Ingeniería de nanotecnología para desarrollar nanoherramientas para ensayos de resolución de célula individualizada. Durante su doctorado, el Dr. Delgado-Gonzalez creó nanopartículas metalofluorescentes para citometría de fluorescencia y de masas como una nueva herramienta para la codificación celular de células vivas. Dichas nanoherramientas demostraron ser compatibles con ensayos celulares de larga duración. Como resultado, se publicó un artículo de primer autor, un artículo como autor de correspondencia, y se obtuvo una patente.

2. Integración tecnológica para desarrollar ensayos moleculares para plataformas diagnósticas. El Dr. Delgado-Gonzalez desarrolló una nanoherramienta para evaluar la activación de proteínas dentro de las células, así como una plataforma de diagnóstico molecular para la detección y cuantificación de miRNAs relacionados con cáncer en muestras biológicas, usando una aproximación química. Además, durante su etapa postdoctoral, el Dr. Delgado-Gonzalez contribuyó de manera significativa a crear un ensayo serológico multiparamétrico usando nanopartículas y citometría de masas.

3. Desvelar resistencia a fármacos en cáncer de ovario usando técnicas de proteómica multiparamétrica con resolución de célula individualizada. El Dr. Delgado-Gonzalez lideró un estudio pionero para desgranar la complejidad de la respuesta al daño por DNA en módulos activados de proteínas que actúan de manera coordinada, usando modelos celulares de cáncer de ovario derivado de pacientes. Estos módulos correlacionan con sensibilidad o resistencia a quimioterapia. Igualmente, el Dr. Delgado-Gonzalez caracterizó el microambiente tumoral de cáncer de ovario para identificar un mecanismo por el cual las células Natural Killer captan una proteína de las células tumorales para disminuir su capacidad de respuesta inmune frente a células tumorales. Gracias a esta investigación, el Dr. Delgado-Gonzalez consiguió financiación como investigador principal para caracterizar el microambiente tumoral en cáncer de ovario.

En base a su trayectoria científica y experiencia, la línea de investigación propuesta presenta INSIGHT-OC, una metodología innovativa multi-ómica que combina química, nanotecnología, biología molecular, biología del cáncer y espacial, codificación celular y técnicas de proteómica con resolución de célula individualizada, para decodificar la resistencia a fármacos, principalmente cáncer de ovario.

El objetivo es dilucidar mecanismos celulares intrínsecos y extrínsecos de resistencia a quimioterapia para identificar nuevas dianas terapéuticas y desarrollar biomarcadores de respuesta a fármacos. Para ello se plantean los objetivos (1) caracterizar los mecanismos intrínsecos usando citometría de masas; (2) Resolver los mecanismos extrínsecos mediante técnicas de proteómica espacial; y (3) Descubrir biomarcadores derivados del secretoma usando nanopartículas.

Resumen del Currículum Vitae:

El Dr. Antonio Delgado Gonzalez es un investigador postdoctoral en el laboratorio del Profesor Garry P. Nolan en Stanford University, Estados Unidos. Es un investigador multidisciplinar que estudia los mecanismos moleculares de resistencia a fármacos en cáncer, especialmente en cáncer de ovario. Su línea de investigación se centra en estudiar (1) el microambiente tumoral y la respuesta por daño a DNA, y (2) la heterogeneidad clonal en las células tumorales y su reorganización espacial, como principales determinantes de resistencia a fármacos. El objetivo a largo plazo de su investigación es generar nuevos conocimientos en la biología del tumor desde una perspectiva de visión de sistema, con el potencial de desvelar mecanismos de resistencia a fármacos, identificar nuevos biomarcadores predictivos y dianas terapéuticas. Su objetivo final es entender, predecir y acabar con la resistencia a fármacos en tumores sólidos, principalmente cáncer de ovario.

Sus áreas de conocimiento y experiencia incluyen química farmacéutica y orgánica, química biológica, biología molecular y del cáncer, estrategias de conjugación, caracterización proteómica multiparamétrica con resolución de célula individualizada, cultivos celulares, ingeniería celular y codificación celular, modelos tumorales en 3D y desarrollo e integración de métodos y ensayos.

Durante su carrera, el Dr. Delgado-González ha publicado 15 artículos (6 como primero o co-primer autor, y 1 como autor de correspondencia en revistas de alto índice de impacto). Además, ha presentado su trabajo en 25 congresos nacionales e internacionales, y posee una patente.

El Dr. Delgado-González es doctor en biomedicina *cum laude* por la Universidad de Granada. Durante su doctorado en el laboratorio de los Dr. Rosario Sánchez Martín y Dr. Juan José Díaz Mochón, integró nanotecnología con aproximaciones químicas para desarrollar reactivos biocompatibles para ensayos moleculares y celulares como herramientas de codificación celular en células vivas. Igualmente, durante su tesis doctoral desarrolló una plataforma de diagnóstico para la detección directa y la cuantificación de miRNAs de células tumorales como biomarcadores.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

En noviembre 2020 se unió al grupo de la Dra. Fantl en la Universidad de Stanford. La investigación del Dr. Delgado-Gonzalez se centraba en descubrir mecanismo moleculares y celulares de resistencia a fármacos en cáncer de ovario. Su investigación se presenta en tres aproximaciones: (1) diseccionar mecanismos moleculares de resistencia a fármacos en respuesta al daño por DNA usando; (2) Caracterizar profundamente la composición celular del microambiente tumoral en cáncer de ovario; y (3) analizar las interacciones espaciales para identificar biomarcadores espaciales de respuesta a fármacos; usando técnicas de proteómica.

En Septiembre 2022, el Dr. Delgado-Gonzalez se unió al grupo del Prof. Garry P. Nolan, financiado por la Ovarian Cancer Research Alliance, para liderar un proyecto como investigador principal, centrado en la caracterización de la arquitectura espacial del microambiente tumoral en cáncer de ovario. Actualmente investiga la heterogeneidad clonal y la resistencia a fármacos en cáncer de ovario a través de la integración de ensayos de cribado de alto rendimiento, edición génica, modelos in-vitro 3D, codificación celular y espacial, y técnicas proteómicas multiparamétricas e imagen.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: NIETO SACHICA, JUAN CAMILO
Referencia: RYC2025-056714-I
Correo Electrónico: juan.nieto@cnag.eu
Título: Integrative Immuno-Genomics: Decoding Human Immune States to Transform Inflammatory and Cancer Care

Resumen de la Memoria:

My scientific trajectory lays the foundation for establishing an independent Immuno-Genomic Analysis Group dedicated to decoding human immune responses through single-cell genomics and translational immunology. Across my career, I have integrated advanced genomic technologies with deep immunological expertise to investigate how immune cells behave, interact, and fail in diverse pathological environments. By profiling immune states from clinically accessible human fluids, including blood, pleural effusion, and cerebrospinal fluid, I have generated high-resolution immunogenomic datasets that reveal cellular mechanisms driving inflammation, immune dysregulation, and treatment response. These contributions demonstrate my ability to translate molecular insights into clinically actionable knowledge, enabling the development of diagnostic tools, stratification strategies, and immunomodulatory intervention concepts. The convergence of immunology, genomics, and clinical application defines my scientific vision: to create a research program that leverages high-dimensional immune profiling to transform the understanding and management of inflammatory diseases and cancer.

Publication record:

During my research career across multiple leading research centers, I have published 50 papers, including 20 as first author and 4 as corresponding author in high impact journal as Nature, Nature Genetics, Immunity, Nature Communications, Journal of Hepatology, underscoring both my active contribution and growing independence in the field. My work has garnered a h-index of 24 and 1,980 citations, reflecting its significant impact within the immunology research community. Additionally, I have co-authored 2 recent accepted papers as a co-last author in Nature Medicine and Cell Reports Medicine with my current supervisor, Holger Heyn, highlighting my critical role as an immunologist complementing his expertise in technology development. This publication record not only validates my readiness to establish an independent research career but also showcases my ability to bridge disciplines effectively. My research is centered on leveraging genomics to interpret and translate basic immunology into clinical applications for diverse diseases, including inflammatory and autoimmune disorders, cancer (including hematology malignancies), and infectious diseases. Through collaborations with public and private partners, supported by the CNAG, I aim to advance precision medicine and foster multidisciplinary approaches to address complex biomedical challenges

Resumen del Currículum Vitae:

My scientific career integrates immunology, single-cell genomics, and translational medicine to understand how immune dysfunction drives human disease. I have developed a multidisciplinary trajectory across hospital-based research, biomedical institutes, and a leading European genomics center, enabling me to bridge mechanistic immunology with clinically relevant applications. During my PhD at IIB-Sant Pau, I investigated immune failure in cirrhosis and cancer, focusing on how microbial translocation and disease-associated fluids shape innate and adaptive immunity. Through corresponding-author studies, I characterized monocyte, lymphocyte, and cytokine dysregulation in Crohn's disease, cirrhosis, and malignant effusions, establishing my early independent contributions to human immunology and translational research. As a postdoctoral researcher at the Vall d'Hebron Institute of Oncology, I expanded into cancer immunotherapy, designing and optimizing experimental systems to study the effects of PD-1 blockade in hematological malignancies. My research identified 2 mechanisms of T cell activation relevant to transplantation outcomes and informed clinical practice. This stage strengthened my profile in translational immunology and my ability to integrate immune phenotyping with clinical data. At CNAG, I have focused on highdimensional profiling of immune responses across inflammatory, infectious, oncological, and neurological diseases. A major achievement demonstrating my independence and leadership is my corresponding-author Nature Medicine study, where I led the conceptual framework, coordinated clinical and analytical teams, and integrated multiomic data to uncover mechanisms of immune dysfunction in malignant pleural effusions. This work exemplifies



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

my ability to direct clinically grounded immunogenomic research with significant translational relevance. My leadership is further supported by competitive funding as principal investigator of a project from the European Foundation for the Study of Chronic Liver Failure, enabling staff hiring and single-cell/ATAC-seq profiling of neutrophils in acute-on-chronic liver failure. I supervise three PhD students across European and industry-linked collaborations and have mentored multiple Master's students, establishing my readiness to lead an independent research group. I contribute to international scientific networks, including the Human Cell Atlas Immunology Working Group, the MSCA SIGNATURE Doctoral Network, and Germany-Spain collaborations in leptomeningeal disease. I also serve as scientific advisor to Omniscope and Biocompare, supporting the development of immunogenomic technologies and adaptive receptor sequencing tools with clinical applications. During my research career across multiple leading research centers, I have published 50 papers, including 20 as the first author and 4 as the corresponding author, underscoring both my active contribution and growing independence in the field. My work has garnered a h-index of 24 and 1,980 citations, reflecting its significant impact within the immunology research community. All of this collaborative work has strengthened my research trajectory, which I plan to advance further with the support of the Ramon y Cajal grant.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: PÉREZ, AZUCENA
Referencia: RYC2025-054963-I
Correo Electrónico: azucena.perez@uv.es
Título: Molecular mechanisms of neurodegeneration in disease

Resumen de la Memoria:

My scientific career has been driven by my interest in molecular mechanisms that lead to neurodegeneration in different diseases. Deciphering the pathways that cause cell death not only helps us understand pathology but also leads to the discovery and design of potential therapeutic targets to halt disease progression. As an undergraduate student, I collaborated with Dr. Rubén Artero's lab, at the UV, studying Myotonic Dystrophy, and with Dr. Isabel Mérida, at the CNB (CSIC, Madrid) focusing in lipid signaling in cancer.

My scientific and technical training in Neuroscience, particularly in Neurodegenerative diseases, is extensive. As a MS and PhD student, I joined Dr. Lola Ledesma laboratory (CBMSO, Madrid), where I focused on studying the role of lipid alterations in aging (Pérez-Cañamás et al., Neurobiol Aging, 2016) and in neurodegeneration, particularly in Niemann Pick disease type A (Pérez-Cañamás et al, Mol Psychiatry, 2016; Gabandé-Rodríguez and Pérez-Cañamás et al., EMBO J, 2017). In parallel, I participated in an international collaborative project in which we developed a novel approach to deliver gene therapy to NPA mouse models and primates (Samaranch and Pérez-Cañamás et al., Sci Trans Med, 2019).

Next, I moved to the United States in 2017 and joined Dr. Stephen Strittmatter's laboratory at Yale University. Part of my work as a postdoc focused on the role of the lysosomal protein TMEM106B, a Frontotemporal dementia (FTD) risk factor, in two different lysosomal diseases associated to FTD (Pérez-Cañamás et al., Brain Comm, 2020). On the other hand, I started a new research line by exploring Parkinson Disease (PD) pathogenesis. I performed a comprehensive, unbiased screen to identify receptors for alpha synuclein aggregates (Pérez-Cañamás et al., Nat Comm 2025). The technical part of this project involved the compilation and organization of several cDNA libraries containing genes that encode for plasma membrane proteins. The work was funded by the Michael J Fox Foundation for Parkinson Research, where I participate as co-PI. This award granted me the opportunity to manage and report funding and work as an independent researcher.

After completing a postdoctoral stay at Yale University, I decided to return to Spain. At the beginning of 2022 I was awarded with a María Zambrano position and I joined the Molecular Neurobiology Unit (NEUROMOL). The unit is headed by Dr. Isabel Fariñas and includes four independent neurobiology laboratories at the UV. Currently, I am developing my own research line in PD at NEUROMOL.

My postdoctoral work at the Strittmatter lab at Yale identified new receptors for alpha synuclein aggregates at the cell surface. The follow-up work focused on two of these receptors expressed in neurons which mediate alpha synuclein spreading and toxicity. But interestingly, 5 of these hits (30% of total) are expressed in microglia. Typically, alpha synuclein propagation studies in PD focus on neuronal toxicity, since the presence of Lewy Bodies (intracellular inclusions characteristic of PD) strictly affects neurons. However, little is known about the participation of other brain cell types in alpha synuclein spreading. Thus, I intend to further explore pathological alpha synuclein propagation potentially mediated by microglia.

Resumen del Currículum Vitae:

My first contacts with science as an undergraduate student where at Rubén Artero's lab (UV, Valencia) and Isabel Mérida's lab (CNB, Madrid). As a MS and PhD student, I joined Dr. Lola Ledesma's lab (CBMSO, Madrid), where I focused on studying the role of lipid alterations in aging (Pérez-Cañamás et al., Neurobiol Aging, 2016) and in neurodegeneration. We described alterations in a calcium ATPase (PMCA) due to lipid accumulations (Pérez-Cañamás et al, Mol Psychiatry, 2016). In addition, we explored alterations in microglia, a population of brain cells, and proposed a critical role for these cells in the disease (Gabandé-Rodríguez and Pérez-Cañamás et al., EMBO J, 2017). In parallel, I participated in an international collaborative project in which we developed a novel approach to deliver gene therapy to NPA mouse models and non-human primates (Samaranch and Pérez-Cañamás et al., Sci Trans Med, 2019).

Motivated to continue studying neurodegeneration mechanisms in major brain disorders, I moved to the United States in 2017 and joined Dr. Stephen Strittmatter's lab at Yale University. Part of my work as a postdoc focused on the role of the lysosomal protein TMEM106B, a Frontotemporal dementia (FTD) risk factor, in two different lysosomal diseases associated to FTD (Pérez-Cañamás et al., Brain Comm, 2020). On the other hand, I started a new research line by exploring Parkinson Disease pathogenesis (Pérez-Cañamás et al., Nat Comm, 2025). This work was funded by the Michael J Fox Foundation for Parkinson Research, where I participate as co-PI.

The aforementioned work lead to the publication of 5 scientific publications as a first author in relevant journals in Neuroscience, including The EMBO Journal, Molecular Psychiatry, Science Translational Medicine and Brain Communications. My technical skills include, but are not limited to, protein purification, molecular cloning, electrophysiology, calcium recordings, confocal imaging, CRISPR, unbiased-multiplexed screenings in cell cultures, and mouse surgeries and behavior. During my career, I have supervised and trained a total of 12 undergraduate and MS students. My communication skills have been improved by presenting my research results at weekly lab meetings and journal clubs, department meetings and national and international scientific conferences, such as FENS forum.

In each stage of my scientific career, I have been able to secure independent funding: (1) as an undergraduate student, I received funding to develop research from the UV and CSIC; (2) my MS studies and project were financed by the UAM University, Madrid; (3) as a PhD student at CBMSO, I was awarded with an FPU fellowship, one of the most prestigious national PhD fellowships; (4) during my Postdoctoral stay at Yale, I received a grant from the Michael J Fox Foundation for Parkinson Research (\$150000) where I participate as co-PI. In January 2022 I returned to Spain, to the UV, as a María Zambrano awardee. Now as a Plan GenT and an R3 certified researcher, I am expanding my investigation on PD. The research project I designed has already received funding from the Fundación Tatiana Pérez de Guzmán el Bueno (co-PI) and from the Plan GenT (SEJIGENT), in which I participate as PI. With this application for a Ramón y Cajal position, I intend to launch my career as a PI and to stabilize my position at the UV.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: SANTIAGO FERNÁNDEZ, OLAYA
Referencia: RYC2025-055804-I
Correo Electrónico: olaya12@hotmail.com
Título: Role of Proteostasis in Aging: From Molecular Mechanisms to Therapeutic Interventions

Resumen de la Memoria:

Over the past ten years, my research career has focused on studying the molecular mechanisms driving aging and age-related pathologies, centering on loss of proteostasis and autophagy impairment as causal drivers of tissue dysfunction. Integrating in vivo mouse models, primary cell systems, multi-omics (proteomics, transcriptomics) and bioinformatics, my work has generated mechanistic insights and contributed to the development of therapeutic strategies targeting age-associated diseases.

During my doctoral training in Dr. Carlos López-Otín at University of Oviedo, I developed a CRISPR/Cas9-based strategy as a systemic therapy for premature aging, demonstrating that AAV9-mediated Cas9 delivery achieves a reduction in the toxic progerin accumulation across tissues, significantly extending lifespan and healthspan in Hutchinson-Gilford progeria syndrome (HGPS) mice. This study contributed to position gene-editing as a realistic therapeutic approach for HGPS and influenced subsequent preclinical developments in the field. During this period, I also contributed to identifying longevity-linked DNA repair genes through giant tortoise comparative genomics and explored AIRAPL loss as an oncogenic proteostasis defect driving myeloid transformation via IGF1R hyperactivation.

In my postdoctoral stay in Dr. Ana María Cuervo's laboratory at Albert Einstein College of Medicine, I provided first evidence that chaperone-mediated autophagy (CMA) declines progressively in skeletal muscle during aging, directly causing myofiber damage, reduced muscle force and calcium dysregulation. Critically, genetic CMA restoration in aged mice restored strength, morphology and proteome integrity, establishing CMA as a potential sarcopenia therapeutic target.

My proposed independent line for the Ramón y Cajal program will focus on identifying CMA's molecular regulators in skeletal muscle to elucidate novel therapeutic targets restoring proteostasis, contractile function and regenerative capacity, while validating pharmacological CMA activators against sarcopenia and Duchenne muscular dystrophy. This builds directly on my expertise but achieves full independence by shifting from the consequences of CMA loss to causal mechanisms. I will pursue this objective by using genome-wide CRISPR screens to identify muscle-specific CMA modulators, in vivo dynamic mapping and translational pharmacology.

Resumen del Currículum Vitae:

My scientific career, focused on the molecular mechanisms of aging and age-related diseases, has equipped me with the expertise and leadership skills essential for my future research trajectory.

During my Ph.D. studies in Biomedicine in Dr. Carlos López-Otín's laboratory at the University of Oviedo, I developed a CRISPR/Cas9-based gene editing therapy for Hutchinson-Gilford progeria syndrome (first-author in Nature Medicine), and contributed to the genomic characterization of giant tortoises as long-lived models, as well as to the discovery that loss of the proteostasis factor AIRAPL drives myeloid transformation. These efforts yielded one first-author research article, one first-author perspective, three co-authored research papers, and one co-authored book chapter in high-impact journals. During this time, I supervised early-career researchers, co-directing one Master's thesis and one Bachelor's thesis. An international short-stay FPU fellowship enabled me to join Dr. Ana Maria Cuervo's laboratory at Albert Einstein College of Medicine (New York), laying the foundation for my current postdoctoral research. My pre-doctoral work earned Ph.D. awards from the University of Oviedo and the Royal Academy of Medicine of Asturias, underscoring its quality and impact.

During my postdoctoral stay in Dr. Ana Maria Cuervo's laboratory, I expanded my focus to chaperone-mediated autophagy (CMA) in skeletal muscle aging, leading a study demonstrating CMA decline's role in age-related myopathy and muscle weakness (first-author in Nature Metabolism). Besides, I have co-authored 8 additional papers on high-impact journals through collaborations within the lab and with international groups. This has significantly strengthened my expertise in proteostasis and aging.

Beyond research, I contribute to the scientific community as a peer reviewer for leading journals such as Cell Reports, Nature Communications, and Frontiers in Aging, and as a guest editor for a special issue in Frontiers in Aging. These roles reflect my commitment to upholding research standards and advancing scientific excellence.



MINISTERIO
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: LOPES DOS SANTOS, VITOR
Referencia: RYC2025-054781-I
Correo Electrónico: vtlsantos@gmail.com
Título: Cell-type-resolved mechanisms of hippocampal network patterns and memory processes
Resumen de la Memoria:

I am a systems neuroscientist investigating how hippocampal circuits coordinate learning, memory, and behaviour. My trajectory integrates advanced analytical frameworks with state-of-the-art in vivo electrophysiology. I began my scientific career as an engineering intern at the International Institute of Neuroscience of Natal (Brazil), developing low-cost recording devices and behavioural automation systems. During my PhD at UFRN (Brazil), I established a methodological line on neuronal cell-assembly detection, leading to two corresponding-author papers that introduced analytical tools now widely adopted internationally and still increasing in citation impact. A funded research stay at Leicester University (UK) broadened my expertise into temporal coding and resulted in two additional first-author publications.

Since 2015, I have been a postdoctoral researcher in the Dupret Programme at the MRC Brain Network Dynamics Unit (University of Oxford), where I brought an independent analytical perspective into an environment centred on state-of-the-art experimental neuroscience. I developed and implemented new signal-analysis approaches to track pathway-specific and laminar-specific hippocampal dynamics, revealing how distinct subnetworks support memory encoding, retrieval, and sleep-related reactivation. In parallel, I built full experimental independence, mastering high-density silicon probes, laminar recordings, optogenetics, and behavioural paradigms. This work led to three original research articles where I am co-corresponding and first or co-first author (Neuron 2018; Cell Reports 2025; Neuron 2025), as well as a co-corresponding-author perspective in Neuron (2023). Together, these studies show how oscillatory components, hippocampal layers, and ripple diversity shape the transformation and consolidation of memory representations.

Throughout this trajectory, I have cultivated long-term international collaborations and taken on increasing leadership roles. I co-supervised two completed PhD theses (Oxford and UFRN), supervise ongoing PhD projects, and secured funding as principal investigator (CNPq Support Network MCTI/FNDCT no. 22). I also obtained funding from the Simons Foundation and IBRO to organise the Neural Mechanisms of Cognitive Function symposium, which brought 19 international speakers to Northeast Brazil and provided free access to more than 300 students from the Global South. My commitment to open science has been recognised with the 2024 MRC BNDU Director's Award for Open Research, and my code and datasets are openly accessible with full documentation.

My future research programme will investigate the cell-type-specific mechanisms underlying hippocampal network patterns that support learning and memory. Building on my analytical and experimental expertise, I will combine high-density electrophysiology, optogenetic tagging, and computational modelling to determine how distinct interneuron subclasses shape gamma oscillations, ripple diversity, and memory-related population dynamics. This line naturally extends my previous work on network signatures while shifting towards the cellular mechanisms that generate them, representing a clear step toward full research independence. The expected impact is a mechanistic, cell-type-resolved account of how hippocampal circuits encode, update, and retrieve memory.

Resumen del Currículum Vitae:

My research investigates the neural circuits underlying learning and memory, combining electronic device development, advanced data analysis, and in vivo electrophysiology. Building on this foundation, I aim to establish an independent research program.

I have seven corresponding-author publications, including three original research papers from my postdoctoral work in Neuron (2018, 2025) and Cell Reports (2025), as well as a Neuron perspective (2023). During my PhD, I developed a methodological framework for detecting neuronal cell assemblies that became widely adopted in the field, with a 2013 publication (for which I am the sole corresponding author) surpassing 220 citations and showing sustained growth. I have seven first-author publications and numerous co-author contributions, including work published in Cell, Science, Nature Neuroscience, and Nature Communications. I was also invited to co-author a Science review (2021) independently of both my past and current supervisors. According to Google Scholar, my record includes 27 peer-reviewed articles, an H-index of 18, and a total of 1,996 citations.

I have supervised two completed PhD theses (UFRN 2020; Oxford 2025 - recipient of the Gotch Prize for best thesis), and I currently supervise a PhD student in Brazil since 2024. I have taught undergraduate and postgraduate courses in Brazil and the UK, delivered invited lectures internationally, and have served on PhD defence committees across Spain, Argentina, and Brazil.

I maintain a strong commitment to open science, with all code and datasets publicly available, and received the 2024 MRC BNDU Director's Award for Open Research.

I have secured funding as Principal Investigator, including a CNPq Support Network MCTI/FNDCT grant (2025-2027). Earlier in my career, I received an IBRO-ISON Research Fellowship and a CAPES Science Without Borders Fellowship. I co-organised the 2025 Neural Mechanisms of Cognitive Function symposium, funded by the Simons Foundation and IBRO, bringing 19 international speakers to Northeast Brazil and providing free access to more than 300 students from the Global South.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: MORA BUCH, RUT
Referencia: RYC2025-054254-I
Correo Electrónico: rutmorabuch@gmail.com
Título: Harnessing cytokine-guided T cell phenotype for immunotherapy in tissues

Resumen de la Memoria:

My scientific trajectory has been dedicated to understanding how cytokine signaling influence T cell phenotype and function. During my PhD at the University of Barcelona/IDIBAPS, I investigated endogenous mechanisms with the potential to resolve chronic intestinal inflammation. I identified that the IL-1 decoy receptor, IL-1R2, acts as a regulator of pathogenic Th1/Th17 response in ulcerative colitis, suggesting its relevance as a biomarker and therapeutic target. I also contributed to studies describing alterations in CD4⁺ T cell response to microbiota in Crohn's disease. A research stay at the University of Oxford enabled me to strengthen my expertise in tissue immunology and preclinical disease animal models.

As a postdoctoral researcher at Massachusetts General Hospital/Harvard Medical School, I studied tissue-resident memory T cells (TRM), a subset essential for localized protection in tissues. My work showed that IL-4, associated with type-2 inflammation, reduces TRM establishment and antiviral activity by interfering with TGF- β signaling. This provided mechanistic insight into how chronic inflammatory environments may compromise tissue immunity. I also contributed to studies demonstrating that TRM competence is influenced during the T cell naïve stage, and to characterizing CD49a as a marker associated with long-term persistence and effector potential.

Since 2021 at the Banc de Sang i Teixits (BST) in Barcelona, my research has been focused on advanced T cell therapies. I investigate how donor-intrinsic factors, including HLA genetics, viral serostatus, and T cell memory composition, influence the functional properties of allogeneic T cell products. I have led work defining criteria for optimal selection of virus-specific T cell donors targeting CMV, EBV and BK polyomavirus. Within an international consortium (ACT4COVID), I also contributed to the development of GMP-compatible procedures for the expansion of SARS-CoV-2-specific T cells from cryopreserved samples for immunotherapy.

My proposed independent research line will build on this background to improve the persistence of therapeutic T cells in solid tissues. I will examine (1) how cytokines present in tumor and inflamed environments shape tissue residency, and (2) how to enhance TRM-like features during ex vivo manufacturing by adjusting cytokine exposure. The aim is to provide principles that support the design of T cell therapies with improved retention, durability, and protective function in solid tumors, viral infections, and chronic inflamed tissues.

Overall, my work integrates mechanistic immunology with clinically oriented development, supporting the establishment of a research program that contributes to innovation in advanced T cell therapies.

Resumen del Currículum Vitae:

My professional career has progressed through a consistent focus on T cell biology and its translation into clinical applications. I completed my PhD at the University of Barcelona/IDIBAPS, where I contributed to projects investigating immune pathways relevant to pathogenic T cells in inflammatory bowel disease. I subsequently advanced my training through a postdoctoral position at Massachusetts General Hospital/Harvard Medical School, which provided an exceptional international environment and access to leading expertise in cytokine-mediated T cell phenotype and function regulation.

Throughout my career, I have contributed to publications in relevant peer-reviewed journals as Gastroenterology, Nature Immunology, or Science and presented my results as oral talks in national and international scientific meetings. My research activities have been supported by competitive funding as a PI or researcher, and recognitions that reflect the quality of the work and my growing independence. I have supervised early-career researchers and contributed to academic training, helping to foster collaborative and supportive research environments.

Since joining the Banc de Sang i Teixits, I have worked at the interface between academic research and the development of advanced T cell therapy medicinal products. I have participated in the implementation of GMP-compliant procedures for donor selection and T cell manufacturing, and in the design of analytical methods to evaluate product function. These responsibilities have strengthened my experience in regulated development processes and multidisciplinary teamwork involving clinical professionals and technical specialists.

International collaboration has been an important component of my career and has allowed me to contribute to participate in international research initiatives, including efforts during the COVID-19 pandemic. These experiences have supported skills in project coordination and scientific communication.

Overall, my curriculum reflects steady progression toward scientific independence, with experience in mechanistic immunology, translational research, and advanced therapy development. This background positions me to establish a research program in T cell therapy that contributes to both scientific progress and clinical innovation.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: DÍAZ NAVARRO, ANDER
Referencia: RYC2025-056781-I
Correo Electrónico: ander.d.navarro@gmail.com
Título: Cancer genomics and bioinformatic tools development for precision medicine

Resumen de la Memoria:

Throughout my research career, I have focused primarily on two areas of cancer research. On one hand, I have worked extensively on cancer genome analysis and the experimental validation of the discovered alterations, with an emphasis on non-coding mutations. On the other hand, I have developed bioinformatic tools oriented toward precision medicine. These experiences, published in high impact journals, have given me solid expertise in both the experimental and computational sides of genomic research, allowing me to work independently throughout the entire process.

Within cancer genome analysis, I highlight two publications in Nature, in one of which I am co-first author. In this work, we discovered and validated a set of mutations in the U1 gene. The importance of this finding lies in the fact that U1 is a repetitive, non-coding gene, and its mutations disrupt donor splice-site recognition, generating multiple aberrant transcripts. Thanks to this discovery, we were able to classify U1 as a driver gene in medulloblastoma (MB) and chronic lymphocytic leukemia (CLL). Following these publications, I continued the cellular characterization of these mutations, with the experiments and results reported in my doctoral thesis. During my PhD, I also performed the functional characterization of non-coding mutations detected in the 3'UTR of NFKBIZ in CLL, demonstrating my ability to investigate mutations whose effects are more challenging to interpret.

During my predoctoral studies, I also participated in the analysis of large patient cohorts across different cancer types. My work focused on detecting somatic mutations, copy number alterations and structural variants, and studying disease evolution. Among these contributions, I highlight a study published in Nature Communications, where we showed that ctDNA present in the cerebrospinal fluid of MB patients can be used for disease classification and monitoring. I also contributed to the largest chronic lymphocytic leukemia and mantle cell lymphoma cohort studies carried out to date, published in Nature Genetics and Blood, respectively. These projects provided me with extensive experience working in international, multidisciplinary teams.

A significant part of my research trajectory has centered on the development of tools aimed at improving precision medicine. First, I developed RFcaller, a tool for somatic mutation detection from next-generation sequencing data, using read-level features and machine-learning algorithms. RFcaller achieves accuracy comparable to state-of-the-art methods while being faster and requiring fewer computational resources, making it more accessible for small and medium-sized laboratories and for potential clinical use. Additionally, I developed OncoGAN, a generative AI tool capable of simulating high-fidelity synthetic tumor samples that closely resemble the genomic characteristics of real donors but that can be shared without restrictions. Because the ground truth is known, these datasets enable the development of new algorithms for cancer genome analysis and the benchmarking of existing ones. In both projects, I have demonstrated a strong commitment to open science by making all code and data publicly available on platforms such as GitHub, HuggingFace, and Zenodo, and by preparing Docker images to facilitate installation, thereby promoting reproducibility and transparency.

Resumen del Currículum Vitae:

I began my research career in 2013 during my undergraduate studies in Biochemistry and Molecular Biology at the University of the Basque Country, investigating the role of microRNAs in chronic lymphocytic leukemia under the supervision of Prof. África García Orad. Later in 2016, I joined the laboratory of Prof. Xose Antón Suárez Puente at the University of Oviedo, where I completed both my Master's and PhD in Biomedicine and Molecular Oncology, co-supervised by Dr. Ana Gutiérrez Fernández and funded by an FPI PhD Fellowship (a competitive fellowship awarded by the Basque Government). My Doctoral Thesis focused on the study of non-coding mutations in cancer, particularly in hematological malignancies, integrating molecular and cellular biology with bioinformatic analyses of genomes, exomes, and transcriptomes. During this period, I contributed to the discovery and experimental validation of a recurrent mutation in the small nuclear RNA U1 across different cancer types, published in Nature, for which I am co-first author. I also conducted a research stay at the University of Oulu (Finland) under the supervision of Dr. Valerio Izzi, funded by an EMBO Scientific Exchange Grant. There, I specialized in the analysis of the extracellular matrix and the impact of U1 mutations on the tumor microenvironment, resulting in an additional publication. For my Doctoral Thesis, I was awarded the "International PhD" with "Cum Laude" distinction and the "Extraordinary Doctoral Award" from the University of Oviedo, in recognition of the excellence of my dissertation.

In 2023, I began my postdoctoral project at the University of Toronto and the Ontario Institute for Cancer Research under the supervision of Prof. Lincoln Stein and Dr. Bo Wang, supported by a Fellowship in Genome Data Science co-funded by CANSSI Ontario and Ontario Genomics. There, I developed an artificial intelligence algorithm capable of generating synthetic tumors to evaluate and improve genomic analysis tools. This work was published in Cell Genomics, where I am first and co-corresponding author. The presentation of this project earned me the "Ontario Rising Stars in Cancer Research Network Award" at the OICR Translational Research Conference. Currently, to foster the use of this tool, I co-lead a multidisciplinary working group within the International Cancer Genome Consortium (ICGC-ARGO). To date, I have published 17 articles in high-impact journals (10 in D1, 3 in Q1), which have collectively been cited more than 1,200 times, as well as 2 preprints that have been presented at national and international conferences. Of these publications, I am first or co-first author in three and corresponding author in two. I have also served as a peer reviewer for journals such as BioData Mining, Microbial Genomics and Briefings in Bioinformatics.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: HERNANDO FUSTER, BARBARA
Referencia: RYC2025-055954-I
Correo Electrónico: hf_barbara@hotmail.com
Título: UNRAVELLING SPATIOTEMPORAL GENOMIC EVOLUTION TO INFORM HEAD AND NECK CANCER MANAGEMENT

Resumen de la Memoria:

I am a Biotechnologist with in-depth knowledge in both experimental and computational genome sciences. In 2017, I received my PhD with extraordinary distinction for my study in the genetic basis of skin cancer predisposition. As part of my career development plan, I have performed stays with internationally renowned scientists including Prof. Zalfa Abdel-Malek (University of Cincinnati, USA), Dr. Nicholas McGranahan (UCL Cancer Institute, UK), Dr. Geoff Macintyre (CNIO, Spain), and Dr. Sarah Aitken (Yale School of Medicine, USA). These secondments enlarged my experience in processing patient biopsies, establishing patient-derived models, harmonising clinical data, analysing genomic data, and extracting histopathological traits for integrative analyses. My unique expertise in deciphering mutational signatures from genomic data has enabled multiple international collaborations, most notably within the Pan Prostate Cancer Group – an international consortium leading the molecular understanding of prostate cancers via AI-driven integration of multi-omics data.

In January 2024, I started my independent research line at the Spanish National Cancer Research Centre (CNIO) supported by a La Caixa Junior Leader Fellowship. My programme focuses on developing advanced computational algorithms to unravel the mutational processes that shape tumour evolution and therapy resistance, moving towards single-cell, single-alteration resolution. I have recently developed an innovative method to assign each copy number alteration in a tumour genome to the mutational process that generated it, and an AI-based predictive framework to forecast clinically relevant driver alterations. These technologies open new avenues for identifying ongoing mutational forces, which has important clinical implications as they can unveil current tumour vulnerabilities and inform more efficient treatments.

Building on this foundation, my research line aims to integrate single-cell genomics with digital pathology to create robust evolutionary models that link mutational processes, microenvironmental pressures, and spatial tissue architecture. This integration will enable us to capture early evolutionary events that are invisible to routine diagnostic assays, offering unprecedented insight into how normal tissues transition into malignancy. This knowledge has strong potential to inform preventive therapeutic interventions and to yield new biomarkers for early detection and patient stratification.

I will use head and neck cancer as the primary disease model for my programme, as it offers access to serial biopsies and represents a clinically urgent challenge due to its high genomic instability, limited therapeutic alternatives, poor patient outcomes and complex evolutionary trajectories. By integrating expertise in genomics, pathology, clinical oncology and computational science, my team will dissect the mutational processes and evolutionary forces operating in premalignant and malignant lesions, develop multimodal prediction models for risk stratification and treatment response, and design minimally invasive workflows for early detection using saliva samples. Ultimately, my research programme aims to advance genomic pathology, early detection and personalised intervention in head and neck cancer, with broader applicability across solid tumours.

Resumen del Currículum Vitae:

I completed my undergraduate degree in Biotechnology at Polytechnic University of Valencia, specializing in Biomedical Sciences by conducting a master degree at London Metropolitan University. After working as Product Manager in the Healthcare department of a Biotechnology company, I joined the Melanogen Research group at the Jaume I University of Castellon, completing a PhD in Health Sciences with extraordinary distinction in 2017 under the supervision of Dr Conrado Martinez-Cadenas and Dr Gloria Ribas. My PhD project aimed at exploring the genetic basis of human pigmentation, sunlight sensitivity and skin cancer risk. As part of my PhD programme, I performed an international four-month stay in the laboratory of Prof. Zalfa Abdel-Malek at the University of Cincinnati (Ohio, USA), where I explored the molecular basis of UV-response in adult patient-derived melanocyte cultures.

In March 2019, I was awarded a postdoctoral position to lead a project exploring the role of photoageing in the early stages of skin cancer development. This project was conducted between Jaume I University (Spain), where I established a biorepository of healthy skin tissues, processed samples, and performed DNA sequencing; and the UCL Cancer Institute (London, UK), where I performed computational analyses and mathematical modelling. In April 2021, I joined the research group of Dr Geoff Macintyre at the Spanish National Cancer Research Center (CNIO), where I applied my combined experimental and computational expertise to characterise the mechanisms of chromosomal instability and improve biomarker development for patient care. In January 2024, I was awarded with La Caixa Junior Leader Fellowship to launch my independent research line at the CNIO focused on algorithm development, tumour evolution and translational cancer genomics. I am currently undertaking a three-month research visit at Yale School of Medicine (USA) to broaden my expertise in digital pathology and multimodal data integration.

I have authored 36 peer-reviewed publications (18 in the cancer genomics field, 12 as first author) in high impact journals such as Annals of Oncology, Nature Genetics and Nature. Taking into account all my publications, I have an h-index of 13 according to Web of Science. My contributions extend beyond publications to innovation, as evidenced by being an inventor of 3 patents (all licensed to Tailor Bio Ltd.) and the developer of 1 software. I am also an active member of 2 international consortia, and have senior roles in 4 funded research projects.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

In parallel to my research, I am deeply committed to supporting early-career scientists by organizing training activities as a board member of the CNIO Postdoctoral Association, teaching genomics to BSc and MSc students, and being the (co)-director of 1 PhD, 1 MSc and 6 BSc theses. As part of the Computational Oncology Group, I currently lead a team of 4 (2 postdocs and 2 PhD students), and manage the computational infrastructure. I also engage in science outreach through public events and media appearances.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Biomedicina

Nombre:

LUCENA CACACE, ANTONIO

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RYC2025-054189-I

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Título:

Cell-Cycle-Guided Control of Human Tissue Plasticity, Maturation, and Regeneration

Resumen de la Memoria:

My scientific trajectory is unified by a central question: how cell-cycle control and epigenetic regulation shape cell identity, tissue plasticity, and regenerative competence across development, disease, aging, and human iPSC-derived organoids. From oncology to cardiac and hepatic regenerative biology, my work consistently uses the cell cycle as the mechanistic switch that determines whether cells proliferate, mature, dedifferentiate, or enter a reversible dormant state.

During my PhD in Spain, I uncovered how the metabolic enzyme NAMPT drives cancer progression by enforcing a pluripotent-like state through SIRT1/PARP-dependent cell-cycle deregulation, linking oncogenic dedifferentiation to developmental pathways. This work established the conceptual foundation that cell-cycle rewiring can reactivate latent plasticity, a principle I later translated into regenerative biology.

Since 2018, in Japan (CiRA, Kyoto University; Osaka University WPI-PRiME), I have built an independent research program using human iPSCs to dissect cell-cycle/epigenetic interactions in cardiovascular and hepatic lineages. As Assistant Professor and now Associate Professor/Junior PI, I demonstrated that transient partial reprogramming, a controlled perturbation of cell-cycle and chromatin states, can overcome maturation barriers in cardiomyocytes and epicardium. My patents on p21-mediated quiescence, transient downregulation of cell-cycle inhibitors, and maturation-enhancing reprogramming cycles reflect this unified mechanistic vision.

As first or corresponding author on several high-impact studies (Nature Communications, Stem Cell Reports, npj Regenerative Medicine), I have shown that epicardial and cardiomyocyte maturation depends on reaching a stable, post-mitotic state, whereas regenerative capacity requires selective and reversible unlocking of cell-cycle checkpoints. My work uncovered how SMAD3, CDH18, mTOR, and IGF1/p53 dynamics interact with the cell cycle to determine lineage decisions, stromal support, and fibrosis resistance.

My current research line, under multiple PI-led JSPS-KAKENHI and institutional grants, aims to decode and reverse postnatal epicardial regenerative dormancy, a state characterized by deep epigenetic locking and enforced cell-cycle restraint. Using multi-omic profiling, CRISPR-based perturbations, and mature human heart organoids, I investigate how epigenetic "dormancy nodes" maintain adult epicardium in a non-reactive state, and how brief, identity-preserving reactivation can restore migration, EMT competence, and paracrine repair without inducing pathological proliferation.

Across these projects, the cell cycle is the integrating axis: a developmental timer, an epigenetic gatekeeper, and a therapeutic lever. By mapping how cell-cycle transitions encode or erase regenerative potential, my work builds a mechanistic bridge from cancer plasticity to human organoid maturation and controlled tissue rejuvenation.

Overall, my career demonstrates scientific independence, international leadership, and a coherent, innovative research agenda centered on cell-cycle-guided regenerative reprogramming, positioned to advance Spain's capabilities in stem-cell-based biomedicine and organoid engineering.

Resumen del Currículum Vitae:

My scientific career focuses on how cell cycle and epigenetic regulation govern tissue regeneration, cancer, aging, and differentiation in human pluripotent stem cell-derived organoids. Over the past decade, I have led a multidisciplinary program integrating stem cell biology, epigenetics, and organoid engineering to model cardiac development, disease, and rejuvenation.

As a Junior PI and Research-Track Associate Professor at Osaka University (WPI-PRiME) and former Assistant Professor at Kyoto University (CiRA), I have established independent research lines centered on the functional maturation of human iPSC-derived cardiovascular tissues. My work revealed how partial reprogramming can overcome epigenetic barriers to cell maturation and regeneration, using complex 3D heart organoids and computational modeling.

I currently serve as principal investigator on multiple JSPS-KAKENHI projects and institutional grants totaling over 13 million JPY (~\$100,000). These projects encompass epigenetic control of organoid maturation, iPSC-based disease modeling, and biodigital simulations of regeneration. Through these efforts, I have developed strong expertise in single-cell omics, live imaging, and organoid-scale data integration.

My publication record includes more than 25 peer-reviewed papers, 9 as first or corresponding author, and 7 international patents. I am first and corresponding author of a major paper now in second revision at Nature Biotechnology on partial epigenetic reprogramming in human iPSC-cardiomyocytes, demonstrating my scientific independence and leadership. I am also co-corresponding author on a paper in second revision at Stem Cell Reports, representing the thesis work of one of my students and highlighting my commitment to mentoring.

I maintain strong international collaborations, most notably with Altos Labs and Prof. Shinya Yamanaka, focusing on cellular rejuvenation and partial reprogramming in aging human tissues. I am also part of the Leducq Foundation Transatlantic Network of Excellence (18CVD05), connecting teams across Japan, Europe, and North America to advance precision medicine for cardiac channelopathies.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My work has appeared in journals such as Nature Communications, Stem Cell Reports, NPJ Regenerative Medicine, and Clinical Cancer Research, bridging oncology, metabolism, and regenerative medicine. These studies have contributed conceptual frameworks linking NAD⁺; metabolism, pluripotency, and epigenetic plasticity to cardiac regeneration.

Beyond research, I have co-supervised five Ph.D. dissertations and numerous master's students, fostering skills across cell biology, bioinformatics, and translational science. My mentorship emphasizes autonomy, critical thinking, and international mobility.

I have received distinctions including the CiRA Young Leader Award for Outstanding Achievements in Life Sciences (2023) and the Extraordinary Ph.D. Award from the University of Seville (2022). I have delivered invited talks at Stanford University, the Paris Cardiovascular Research Center, and the Institute of Biomedicine of Seville, and have participated in outreach activities through CiRA and Osaka University.

Overall, my trajectory reflects leadership, originality, and dedication to translational science, bridging molecular mechanisms with regenerative technologies to advance organoid-based medicine.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: ESCOBAR FERNANDEZ, ANE
Referencia: RYC2025-054628-I
Correo Electrónico: ane.escobar@ehu.eus
Título: Nanopartículas fototérmicas y magnetotérmicas para neuromodulación selectiva
Resumen de la Memoria:

My scientific trajectory has been developed at the interface of nanotechnology, biomaterials and neuroscience, evolving toward a distinctive profile in nano-enabled neuromodulation.

During my PhD at CIC biomaGUNE, I specialized in mesoporous silica and titania coatings for antibacterial and osteoinductive applications, producing 6 first-author papers and conducting international stays in Argentina and Germany that consolidated my expertise in materials synthesis, surface functionalization, drug delivery and advanced imaging. My postdoctoral research at i3Bs @ University of Minho expanded my work into neural repair, where I engineered silk fibroin nerve conduits, conductive biomaterials and nanoparticle-based delivery systems for neurotrophic factors, generating 4 first-author publications and establishing collaborations in Portugal and Ireland.

Since 2022, as a Gipuzkoa Fellow at the Materials Physics Center (MPC, CSIC/UPV-EHU), I have established an independent research line in nanoparticle-mediated neuromodulation, supported by competitive funding and high-impact collaborations. I am Principal Investigator of an AEI-funded project (PID2022-137363OA-I00), which enabled the creation of a MEA@NIR laser platform for photothermal control of neuronal networks. I also lead in vitro neuromodulation activities in the highly competitive NeuMoNas consortium (CDTI, ~9 M€), where I developed receptor-targeting strategies for plasmonic and magnetic nanoparticles. This work directly enabled a European patent (EP25383197.8) on nanoparticle-based neuromodulation for ischemia, where I am co-inventor. Through the IKUR NanoNeuro programme, I have introduced advanced methodologies, including targeted nanoparticle immobilization and quantum dot-based optical readout, in collaboration with BioGipuzkoa and Columbia University. Together, these achievements demonstrate increasing independence, technological leadership and translational orientation.

The preliminary results I obtained show that gold bipyramids (AuBPs) can be selectively anchored to neuronal membranes using receptor-specific linkers, confirmed by TEM imaging, and that controlled NIR-pulse irradiation produces reversible, dose-dependent modulation of neuronal firing in MEA platforms with no off-target effects. Similar membrane association has been demonstrated for iron-oxide nanoparticles (IONPs), enabling the extension to magnetothermal stimulation and fully non-invasive paradigms. These findings form the basis of three manuscripts in preparation.

The research line I propose aims to develop next-generation nanoparticle systems for precise and minimally invasive neuromodulation. It integrates four objectives: (1) engineering AuBPs and IONPs with tailored biofunctionalization to target specific neuronal subtypes, including human iPSC-derived populations; (2) optimizing photothermal and magnetothermal stimulation paradigms to achieve safe, reversible and high-resolution control of neural circuits; (3) elucidating the biophysical and molecular mechanisms of thermal neuromodulation, from ion-channel activity to intracellular signalling; and (4) applying these tools to in vitro human models of neurological disorders such as stroke, Parkinson's disease or epilepsy.

Resumen del Currículum Vitae:

I am a biomedical engineer with a solid international trajectory in nanotechnology, biomaterials and neurotechnology, and an emerging scientific leader in nanoparticle-based neuromodulation. My work integrates materials science and neuroscience to design functionalized nanostructures capable of modulating neuronal activity with high precision. I am currently a Gipuzkoa Fellow (2022-2025) at the Materials Physics Center (MPC, CSIC/UPV-EHU).

I am Principal Investigator of the project Photothermal Gold Nanostructures for Neural Activity Modulation (PID2022-137363OA-I00), which established the first MEA@NIR laser neuromodulation platform at MPC in collaboration with BioGipuzkoa. I also play a central role in the large NeuMoNas consortium (CDTI, ~9 M€), leading the in vitro neuromodulation work package and the development of nanoparticle-membrane targeting strategies. This contribution directly enabled patent EP25383197.8, where I am co-inventor. In parallel, within the IKUR NanoNeuro programme, I introduced advanced methods for nanoparticle immobilization, MEA@laser experiments and quantum dot-based optical readout in collaboration with Columbia University.

My scientific production includes 23 publications, 11 as first author, with an h-index of 15. My work spans antibacterial and osteoinductive mesoporous coatings (CIC biomaGUNE), neuroregenerative biomaterials (i3Bs @ University of Minho) and thermoplasmonic neuromodulation (MPC/BioGipuzkoa). I have contributed to major European and international projects (HYMADE H2020, VIROMA FP7, NanOptoNerv FCT, IKUR NanoNeuro, NeuMoNas CDTI), demonstrating sustained participation in competitive multidisciplinary environments.

International mobility has been essential to my career, with research stays in Argentina (CNEA), Germany (University of Greifswald, Surflay Nanotec), Portugal (U. Minho) and ongoing collaborations with Columbia University. These stays strengthened my expertise in mesoporous materials, fluorescence techniques, neuronal cultures and nanostructure-cell interactions and resulted in multiple high-impact publications.

I have supervised and trained early-stage researchers, including the co-supervision of the Master's Thesis @Laser-coupled multielectrode array system for plasmon-driven neuronal stimulation (2023). I routinely train students and researchers in nanoparticle synthesis, neuronal cultures and MEA@laser technologies. I have also taught nanotechnology-related courses at Mondragón University, contributing to formal academic training.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I maintain a strong commitment to public engagement. I have delivered invited outreach talks in “¿Qué sabemos de?” (CSIC), the “Neurotecnologías” series at the San Telmo Museum, Pint of Science and Zientzia Klub, and I have been interviewed multiple times on Basque radio and television (EITB, Radio Euskadi) to discuss the scientific and societal dimensions of emerging neurotechnologies.

Overall, my career demonstrates a coherent progression toward leadership in nano-neuromodulation, supported by competitive funding, technological innovation, international collaborations, scientific production, mentoring and societal involvement.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: BERDUGO VEGA, GABRIEL
Referencia: RYC2025-055092-I
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Título: Novel mechanisms for brain rejuvenation

Resumen de la Memoria:

During my PhD I led a project studying the potential of adult neural stem cells to act as a cognitive reserve and promote cognition during aging in mice. My work showed that increased neurogenesis restored cognition in old mice by counteracting common hallmarks of aged brain circuits, such as neuronal hyperactivity in downstream networks, thus expanding previous notions on the effects of neurogenesis in the brain. My experiments also provided the first formal demonstration of the impact of newborn neurons on the activity of recently discovered engram cells (i.e., the neural substrates of memories) during cognitive flexibility. My findings had important implications for the fields of brain aging and neurodegenerative diseases, given the potential of neurogenesis to be extrinsically modulated, and were summarised in two research articles. This experience inspired me to study molecular and circuit mechanisms regulating engram formation and potential means to recover it during disease, such as in Alzheimer's (AD) where memory is not only impaired but directly lost.

During my postdoctoral studies, I simultaneously carried out two independent projects using engram cells. The first one, conceptualized exclusively by me, focused on the circuit mechanisms underlying time-dependent remote memory generalization, for which I was awarded a prestigious EMBO long-term postdoctoral fellowship. My findings suggest that remote memory generalization is an active process maintained by hippocampo-cortical circuits, rather than the loss of memory precision as traditionally believed. These findings will be of high relevance for stress-related memory conditions such as post-traumatic stress disorders, and the results are currently being prepared for publication. My second project, more directly aligned with my future research plan, centred on molecular rejuvenation through partial reprogramming of engram cells in AD. This project was conceptualized and planned together with my supervisor, and received a 250K grant from the Swiss Synapsis Foundation for Alzheimer Research. My work revealed for the first time, using single-cell multiomic approaches, the epigenetic and transcriptional alterations underlying engram impairments in AD, which has an important resource value for the community. Further, I pioneered a strategy to selectively induce expression of the Yamanaka Factors into engram neurons, thus achieving cell-type specific partial reprogramming. My findings showed that engram reprogramming re-established expression of AD-related molecular aberrations, counteracted neuronal hyperexcitability and rescued memory. Moreover, it demonstrated that targeting rejuvenation strategies to specific cell types (engrams) leads to the restoration of specific cognitive functions (memory) even after the onset of disease, which has profound implications for the field of neurodegeneration. These findings have recently been accepted for publication at Neuron. Expanding on my previous work, I now aim at re-engineering this system in order to re-direct partial reprogramming strategies to other cell types and circuits relevant for disease in a more clinically-oriented manner. This technology is currently being submitted for a patent, on which I am listed as co-inventor.

Resumen del Currículum Vitae:

I obtained my MSc in Neuroscience at the Autònoma University of Madrid, and did a MSc Thesis at the Cajal Institute (Trejo Lab) on mechanisms of depression involving adult hippocampal neurogenesis. After this, all my scientific career has been developed in an international context. This accounts for a total of six years in Germany, where I obtained my PhD (2014 – 2020), and five in Switzerland, where I did my postdoc (2021 – 2025).

I did my PhD in the Center for Regenerative Therapies in Dresden (CRTD, Calegari Lab, Germany), where I led a project studying the potential of adult neural stem cells to act as a cognitive reserve and promote cognition during aging in mice. My work attracted funds in the form of a DIGS-BB Fellow award, which secured my salary during the entire duration of my PhD. My thesis was graded as Summa Cum Laude, the highest distinction in the German academic system. Overall, my findings had important implications for the fields of memory and brain aging, given the potential of neurogenesis to be extrinsically modulated. My PhD work resulted in the publication of two research articles, one of them receiving major attention from the field and ranking in the top 5% of all research outputs ever tracked by Altmetric.

For my postdoctoral work I moved to the École Polytechnique Fédérale de Lausanne (EPFL, Gräff Lab, Switzerland). My first postdoc project was supported by a prestigious EMBO long-term postdoctoral fellowship awarded to me, and was focused on engram mechanisms of remote memory generalization. I also contributed to secure additional funding for my second project through a grant awarded to my postdoc supervisor. This last work focused on molecular rejuvenation through partial reprogramming of engram cells for cognitive rescue in AD, and has recently been accepted for publication at Neuron.

I presented my PhD and postdoctoral work in a total of 24 international conferences, including several oral presentations as invited speaker. I directly supervised five BSc and three MSc students, all of which continued to pursue an academic career. Being aware of the responsibilities of a young scientific leader, I also undertook the EMBO Lab Leadership course, which expanded on my tools and capabilities to direct my future team. I also grew as a lecturer through both structured education, as a regular teacher in the EPFL MSc class "Molecular Neuroscience and Neurodegeneration", as well as science communication initiatives aimed at bringing research culture to the general public, such as in several editions of the "Dresden Long Night of Science" as well as Science Slams.

Finally, I have also participated as Ad hoc reviewer for highly prestigious scientific journals including Science, Journal of Neuroscience, Neuron, Cell Research, International Journal of Molecular Sciences, PNAS, Biological Psychiatry, Plos Biology and eLife.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: SÁNCHEZ GUIXÉ, MÒNICA
Referencia: RYC2025-054287-I
Correo Electrónico: monica.sanchez@irbbarcelona.org
Título: Genómica del cancer pediátrico

Resumen de la Memoria:

My scientific trajectory involves 1) a first Master Project in a rare congenital ataxia in Haukeland Hospital in Norway; 2) a PhD in translational breast cancer research at VHIO; 3) a transition to computational biology through a master at UVIC and a postdoc at IRB; 4) an acquired expertise in pediatric cancer research during the last four years of my postdoc through a close collaboration with oncologists and researchers from Sant Joan de Déu (SJD) Research Institute; and 5) the initiation of my research group at SJD Research institute in the following months thanks to the recently granted CRIS Emerging Leader 2025 Program.

My research line represents an extension of my postdoctoral work on the origin of second malignancies in children (Sánchez-Guixé et al. Cancer Discovery 2024). The use of mutational signatures to time the origin of cancers represents a new perspective to study the origin and evolution of pediatric cancer, and I want to apply this methodology to the overall set of pediatric cancer. I am currently applying this new perspective in a pediatric rhabdoid tumors cohort (Sánchez-Guixé, et al. manuscript in preparation), which will be my first corresponding authorship.

Title: Timing the origins of pediatric cancer: from the driver event to the tumor evolution

Despite large efforts in cancer research over the years, many questions remain about how, when and why cancer develops. This is particularly true for pediatric cancer, with a relatively low incidence, but a devastating disease for affected patients and families. The amount of research effort devoted to this group of diseases has been very low, particularly when compared to adult cancer. This causes a deficit in our knowledge of the causes and origins of pediatric tumors and a lack of treatment options for patients.

Pediatric cancer is different from adult cancer: its origin is thought to be in prenatal development, yet some tumors develop years after birth, up to adolescence and young adulthood. The striking prevalence of some oncogenic fusions in healthy newborns ~100 times more prevalent than the corresponding leukaemia incidence confirms that driver mutations are essential but clearly not sufficient for cancer development. Whether this is also true for pediatric solid tumors remains to be elucidated.

In this project, I propose to study how solid tumors develop in children, adolescents and young adults. Specifically, I aim to precisely time the origin of rhabdomyosarcomas, medulloblastomas and Ewing sarcomas, by timing the genetic driver event "does it occur during embryogenesis?" and the tumoral expansion "could it happen (many) years after the driver event?". With this proposal, I aim to demonstrate how the landscape of somatic mutations of pediatric cancer genomes presents an opportunity to understand the history and origin of pediatric solid tumors.

This ambitious project pursues understanding the origins of pediatric cancer so we can look to a future with better treatments, fewer side effects and, possibly, the prevention of pediatric cancer.

Resumen del Currículum Vitae:

During the last 12 years, I have built a scientific profile that combines experimental, preclinical and computational background. I master laboratory-based experimental assays through my PhD in Dr Serra's lab at VHIO and in-depth computational analysis through the postdoc in Prof. López-Bigas's lab at IRB Barcelona.

In 2012-2014, I completed my first Master of Science in Lund University (Sweden), and the Master Project in Haukeland University Hospital in Bergen (Norway). My work during this stay produced two second-authored publications (Heimdal, Sánchez-Guixé et al. 2014 and Pakdaman, Sánchez-Guixé et al. 2017).

After 3 years and a half in Sweden and Norway, in 2016 I moved back to Barcelona to perform my PhD at VHIO. My PhD at Dr Serra Lab was part of the HORIZON 2020 MSCA ITN: Deciphering PI3K biology in health and disease. My PhD research work involved the study of biomarkers of response in breast cancer treatment, and produced one first author publication (Sánchez-Guixé et al. 2022), 4 co-author publications and one third-author bibliographical review.

In 2019, I enrolled in a second Master in Omics Data Analysis (UVIC). I started a postdoc at the lab of Prof. López-Bigas at IRB Barcelona, where I acquired valuable experience in computational biology. Additionally, I gained important insights into pediatric cancer by working in close collaboration with Dr Jaume Mora, a worldwide recognised expert in pediatric oncology from Sant Joan de Déu (SJD) Hospital in Barcelona. This led to a publication in Cancer Discovery in March 2024.

An important part of my postdoctoral work has been the coordination and lead of intOGen. During the last four years, I have been responsible for leading a team of bioinformaticians to update and improve intOGen. I have successfully delivered two releases: one in May 2023 and another in September 2024 (intogen.org).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I presented my work at numerous international conferences. Some of these include four selected oral presentations: 1) SIOP congress in Ottawa 2023; 2) PEDIAC Symposium in Paris 2023 (where I was honoured with the prize for the best short presentation); 3) Two IRB Biomed Conferences in Barcelona 2023 and 2025. Additionally, I have presented posters at several international congresses and conferences, such as: EACR Congress Torino 2023 and ITCC Vienna 2023. Importantly, I have been invited as a keynote speaker in three international conferences: Summer School in Translational Cancer Research in Albufeira, Portugal 2025; Youth4Kids online in 2025, Cancer Development and Complexity workshop online in 2021.

I have participated in many activities that potentiated my leadership skills. I created the Paediatric Tumours Interest Group, the first paediatric cancer research network in Barcelona. I also joined the IRB Postdoctoral Council. Importantly, I have been involved in the supervision of 3 master theses, and attended several courses on leadership. Moreover, I instructed several lectures at UPF and UIC in Cancer Genomics. Also, I was invited to work as an expert to evaluate candidates for the HORIZON MSCA grants 2024 and 2025.

And very importantly, I have been recently granted the CRIS Emerging Leader Grant 2025, which will allow me to start my own research group at SJD Research Institute in the following months.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: FUENTES FAYOS, ANTONIO CARLOS
Referencia: RYC2025-054567-I
Correo Electrónico: b22fufaa@uco.es
Título: RNA Processing and transcriptional programs: Drivers of Tissue Pathophysiology
Resumen de la Memoria:

My career has been focused on the study of one of the main molecular processes of RNA metabolism, the splicing, with a particular emphasis on splicing alterations as mechanism to drive cell plasticity and homeostasis on intracranial tissues.

The importance of splicing contribution to disrupt cell metabolism leading to an alter state of the cells from cell functionality to molecular pathways has been reflected in my different publications, which have highlighted that keeping the RNA processing regulated is critical to maintain normal tissue homeostasis. These studies allow me to unveil potential biomarkers and therapeutic targets (e.g., SRSF3, SF3B1, PRPF8, [1](#)) offering novel clinical opportunities to control this process in different tissues. My predoctoral stays at Cedars-Sinai MC (USA) and Harvard Medical School (USA) introduced me to single-cell transcriptomics and ex vivo modeling field, which sparked my interest in developing cutting-edge technologies for better understanding transcriptional programs and rapid platforms to develop research models, which help me to pursue a postdoctoral position at Breunig Lab (2022-25). There, I worked on multiple projects, including single-cell transcriptomics, and specially designing and optimizing single-cell proteomics protocols, functional genomics, and immunopeptidomics, using MADR technology to rapidly generate precise custom mouse models. This knowledge has opened new avenues for my career, providing a foundation for innovation and the opportunity to apply my expertise in my current and future research.

My scientific career has been highly productive, supported by collaborations with prestigious researchers that strengthened my international network. I have demonstrated strong commitment to international mobility through research stays (all with scientific productivity), participation in international committees/associations, and active patient-engagement activities. These experiences have enhanced my expertise, leadership, and global scientific connections. Currently, my independence is evidenced by my competitive positions and awards, student mentoring, and my ability to secure funding as a PI. According to this, I believe I am well-positioned to lead an independent research line with the Ramón y Cajal program.

Central to my future research line is to decipher the importance of RNA metabolism regulation and their impact in the cell phenotype/metabolism by its crosstalk with cell transcriptomic programs in the complex landscape of organs development. RNA metabolism, one of the most versatile/dynamic regulatory layers in the cell, constitutes both an evolutionary advantage and a potential vulnerability. While tightly regulated RNA metabolism supports proper development, its alterations can deeply modify key cellular characteristics, including metabolic homeostasis, differentiation state, survival, and even immunopeptidome. Understanding these mechanisms will be fundamental to defining how transcriptomic and regulatory alterations contribute to tissue pathophysiology, from neoplasia to neurodegenerative diseases. This line of research integrates my diverse expertise in cutting-edge technologies, including single-cell transcriptomics, proteomics, bioinformatics, and ex vivo modeling, to drive significant and novel scientific and clinical advances through innovative, translational approaches.

Resumen del Currículum Vitae:

During my doctoral studies (2017-22), I focused on the molecular mechanisms of RNA splicing and its alterations driving neoplastic transformation. My research integrated cutting-edge transcriptomics, advanced in vivo models, and translational approaches to identify key drivers of RNA splicing process, novel therapeutic targets, and resistance mechanisms, aiming to improve outcomes for patients with brain pathologies. Throughout my career, I have demonstrated leadership and collaboration across different disciplines. I established an international research network through predoctoral stays at Cedars-Sinai MC (USA; 2019) and MGH-Harvard Medical School (USA; 2021), wherein I learned mouse modeling and single-cell sequencing techniques. These collaborations continue to influence my work. My scientific output includes 38 publications (9 as first author; 3 as corresponding), in authoritative journals in molecular biology and biomedicine fields with 880 citations. I have received 8 research awards and hold 3 patents. I have also been mentor of 5(+2 ongoing) BSc, 2(+2 ongoing) MScs, and 1(+2 ongoing) PhD theses, contributing to train future scientists. Collaborative projects with expert researchers (e.g., M. Blasco, E. Eyrales, etc) have enhanced the translational relevance of my work by bridging experimental-clinical perspectives. In my postdoctoral position at Cedars-Sinai MC (2022-25), I focused on linking the molecular basis of neurodevelopment to pediatric brain neoplasia, using functional genomics, novel experimental models, and single-cell transcriptomic/proteomics. My work explored the role of ETS transcription factor in neoplasia cell fates, uncovers brain neoplasms immunopeptidomes to identify neoantigens for immunotherapy, and builds on collaborations with my PhD mentor. In mid-2025, I received the Junta de Andalucía Postdoc Fellowship, which enabled me to return to Spain as an Emerging Researcher. This career phase is marked by 10 invitations to present at international conferences, 3 publications (2 as a first author; 1 as corresponding) and 3 upcoming manuscripts. I also secured funding for 3 projects as PI and 1 contract: the prestigious BTC Future Leader I ([2](#)265.678; 2024-27), a Clinical and Translational Science Institute grant (\$9,420; 2024), Parse-Bio single-cell Grant 2025 (\$53.000; 2025-26), Alexion/AstraZeneca ([3](#)55.000; 2025-26). Moreover, I am actively contributing to the academic community as: i) reviewer for leading journals (e.g., Neuro-Oncology, Nature Comm, etc.); ii) member of scientific committees, including EANO, ENEA, IMIBIC, ASTUCE (Spanish Brain Tumor Patients), and chief of the EANO European Journal Club; and iii) member of Program Organizing Committees of International Meetings [e.g., ENEA2023 (Munich), ENEA2024 (Seville), OligoSpain (Córdoba)]. Beyond academia, I engage the public through outreach activities, serve as an international ambassador for ASTUCE and participate in international patient meetings. With this foundation, I am ready to establish my independent research group in Spain under the Ramón y Cajal program. Combining my technical expertise, leadership experience, and collaborative network, I aim to advance in the translational biomedicine field by deeply elucidating different RNA metabolism processes and developing innovative therapeutic strategies using cutting-edge models and techniques.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Biomedicina

Nombre:

FRANCO HENRIQUES, ANA LEONOR

Referencia:

RYC2025-057234-I

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anahenry@gmail.com

Título:

Mechanistic dynamics of the tumor microenvironment driving immune resistance in solid tumors

Resumen de la Memoria:

My scientific trajectory has focused on understanding how stromal, myeloid and lymphoid compartments interact and evolve to shape tumour progression, immune suppression and therapeutic response, with an emphasis on microsatellite-stable colorectal cancer (MSS CRC) with poor immunotherapy outcomes. Throughout my PhD, postdoctoral training and current work, I have combined mechanistic in vivo models, organoid and co-culture systems, single-cell and spatial profiling, and time-resolved approaches to dissect how microenvironmental states arise, consolidate and influence treatment efficacy.

During my doctoral studies in Greece, I identified stromal and inflammatory pathways that enable tumour initiation, clarifying how fibroblast programmes create permissive niches for disease progression. During my postdoctoral year at BSRC “Alexander Fleming,” I investigated how fibroblast-immune and stromal-epithelial interactions regulate tumour initiation and anti-tumour immunity, contributing to high-impact studies on IL-33 signalling and COX-2-driven inflammatory circuits. I also characterised fibroblast heterogeneity using developmental tracing and advanced imaging, revealing how distinct stromal subsets and their spatial organisation influence tissue homeostasis and malignant transformation. This period also strengthened my scientific independence, as I led experimental strategies, integrated high-dimensional datasets and supervised junior researchers.

At IRB Barcelona, I integrated stromal biology with high-dimensional immune profiling and translational models to define the mechanisms driving immunotherapy resistance in MSS colorectal cancer, contributing to landmark studies on TGF β -pathway inhibition, single-cell tumour immune mapping and myeloid-T cell suppressive circuits. I led in vivo therapeutic evaluations, dissected macrophage-driven remodelling of the tumour microenvironment, and developed organoid-fibroblast-T cell systems and spatial approaches that now underpin my independent research programme.

As an independent researcher, I aim to define the cellular and molecular drivers of immune exclusion across MSS CRC, pancreatic ductal adenocarcinoma and liver/biliary tumours. My research programme integrates three axes: (1) reconstructing the temporal emergence of stromal-myeloid transitions that initiate exclusion; (2) determining how tissue-specific immune and stromal landscapes influence exclusion across organs; and (3) dissecting complement-coagulation and fibroblast-immune pathways that maintain suppressive microenvironments. By combining advanced organoid systems, in vivo lineage tracing, spatial single-cell technologies and perturbation-based models, my goal is to identify dynamic, targetable microenvironmental features that can guide more precise and effective immunotherapies for patients with currently untreatable solid cancers.

Resumen del Currículum Vitae:

I am a biomedical researcher specialised in tumour immunology and the tumour microenvironment, with a focus on microsatellite-stable colorectal cancer (MSS CRC) which have limited response to immunotherapy. I completed my Bachelor’s degree in Portugal and my Master’s in the United Kingdom, where I received advanced training in molecular and cellular biology. I then pursued my PhD in Greece, investigating stromal, myeloid and inflammatory pathways that regulate tumour initiation, progression and metastatic competence. This work established my long-term interest in how microenvironmental signals shape tumour behaviour and led to several publications, including first-author articles in high-impact journals.

After finishing my PhD, I undertook a postdoctoral year at BSRC “Alexander Fleming” in Greece, where I deepened my expertise in inflammation, stromal-immune crosstalk and mechanistic in vivo approaches. I subsequently joined IRB Barcelona as a postdoctoral researcher, where my work focuses on the mechanisms driving immune exclusion and resistance to immunotherapy in colorectal and pancreatic cancers. At IRB, I have expanded my technical portfolio to include organoid and co-culture systems, single-cell and spatial transcriptomics, multiplex imaging and perturbation-based analyses. I have led independent experimental components within collaborative projects and supervised 3 Master’s student, 2 research assistants and 2 PhD student working on related topics.

My scientific output includes 10 peer-reviewed publications, three as first or co-first author, with an h-index of 7 and more than 400 citations. Several of these appear in journals with impact factor higher than 30, reflecting the relevance and visibility of my contributions. My work spans fibroblast biology, myeloid and lymphoid programmes, inflammatory and stromal signalling pathways, mechanobiology and therapeutic modulation of suppressive microenvironments.

International mobility has been a defining feature of my training, with research experience in Portugal, the United Kingdom, Greece and Spain. This trajectory has strengthened my ability to work across disciplines, integrate diverse methodological frameworks and collaborate with groups specialising in cancer immunology, spatial technologies, organoid systems and computational biology.

Across nationally and internationally funded projects, I have contributed to conceptual design, experimental strategy, data interpretation and manuscript development. I have gained experience in mentoring junior researchers, coordinating complex datasets and supporting project management and dissemination.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Overall, my curriculum reflects a coherent scientific development centred on understanding how stromal, immune and tumour-cell interactions shape disease progression and therapeutic response. These achievements provide a robust conceptual and technical foundation for establishing a competitive and innovative independent research programme aimed at improving immunotherapy efficacy in solid cancers.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Biomedicina

Nombre:

GONZÁLEZ HERNÁNDEZ, ALBERTO JESÚS

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RYC2025-054191-I

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Título:

Synaptic precision from ion channels to GPCRs: building the framework for nanoscale neuromodulation

Resumen de la Memoria:

My scientific trajectory has been guided by a central question: how do neurons achieve fast, precise, and adaptable control of synaptic signaling? Across my PhD and postdoctoral work, I have combined biophysics, molecular neurophysiology, and advanced imaging to uncover the principles by which ion channels and G protein-coupled receptors (GPCRs) orchestrate neuronal excitability and synaptic function.

During my PhD, I dissected the structural and functional mechanisms of BK potassium channels, key regulators of neurotransmission. By integrating electrophysiology, fluorescence microscopy, and unnatural amino acid mutagenesis, I revealed coordinated intra- and intersubunit rearrangements underlying Ca^{2+} -dependent activation and demonstrated tight nanodomain coupling with NMDARs, establishing fundamental rules of rapid, local synaptic feedback.

In my postdoctoral work, I shifted focus to GPCR-mediated neuromodulation, particularly metabotropic glutamate receptors (mGluRs). I defined how subtype-specific receptor assemblies, allosteric modulators, and C-terminal domain motifs control beta-arrestin engagement, receptor trafficking, and compartment-specific signaling. I discovered ligand- and subtype-specific desensitization patterns in neurons and developed optical and nanobody-based tools to achieve millisecond-resolved control of receptors and ion channels in native circuits. This work bridges molecular mechanisms with functional outcomes and establishes a toolkit for precise spatiotemporal interrogation of neuromodulatory pathways.

To translate these mechanistic insights into human physiology, I have acquired expertise in electrophysiology of human stem cell-derived neurons, uncovering epigenetic determinants of maturation and performing patch-seq to link functional and transcriptomic profiles.

Looking forward, my independent research program will focus on the nanoscale control of synaptic excitability by GPCR-ion channel interactions. I aim to elucidate how nanoscale organization, temporal activation patterns, and molecular regulators shape compartment- and cell-type-specific neuromodulation. Integrating super-resolution imaging, optical control, proximity proteomics, and electrophysiology, I will identify previously unknown GPCR-regulated effectors and define the rules governing their functional engagement. Comparative studies in human and rodent neurons will reveal conserved and species-specific mechanisms, with direct relevance to neurodevelopmental, neurodegenerative, and psychiatric disorders.

Through this integrative approach, my research will generate a systematic framework linking molecular architecture to synaptic function, uncover new targets for therapeutic intervention, and establish a mechanistic foundation for understanding how neuromodulatory signals achieve speed, precision, and adaptability in the brain.

Resumen del Currículum Vitae:

I have developed my scientific career at the interface of biophysics and neurophysiology. I obtained a BSc in Biology (2015), an MSc in Biomedicine (2016), and a PhD in Health Sciences (2021) from Universidad de La Laguna (Spain). During my PhD, I actively contributed as a team member to an ERC-Consolidator project and nationally funded research on BK channel biophysics, calcium nanodomains, and synaptic plasticity, gaining extensive expertise in electrophysiology, structural and functional assays, and nanodomain signaling. My PhD was supported by an FPU fellowship (Formación del Profesorado Universitario).

Since 2022, I have been a postdoctoral researcher at Weill Cornell Medicine (USA), where I investigate the biophysical and molecular mechanisms of GPCR-mediated synaptic modulation. My work focuses on structural and mechanistic studies of metabotropic glutamate receptors, including subtype-specific beta-arrestin coupling, desensitization, and optical/photopharmacological control strategies. These studies connect molecular mechanisms to functional outcomes in synaptic signaling, with implications for understanding neuronal excitability and plasticity.

I have published extensively in high-impact journals, including Nature, Nature Communications, Nature Chemical Biology, PNAS, Structure, Angewandte Chemie, Science Advances, and Trends in Neurosciences, with multiple first-author contributions. My research spans ion channel nanodomain regulation, receptor-specific signaling and photopharmacology

I have presented my work at 12 international meetings, including the Biophysical Society Annual Meeting and Gordon Research Conferences, delivering oral talks, posters, and serving on the scientific and organizing committee of a Gordon Research Seminar.

I have progressively taken on independent responsibilities and competitive funding. During my postdoc, I received the Margarita Salas Fellowship (2023, Ministry of Universities, Spain) and currently serve as Principal Investigator of a Charles H. Revson Foundation Biomedical Research Fellowship (2024-2026, \$245,000) on GPCR-mediated neuromodulation. In parallel, I contribute as a team member to a major NIH/NINDS project (\$3M).

Overall, I combine solid biophysical training, multidisciplinary expertise, and an emerging record of independent leadership, reflected in my publications, funding record, and international collaborations. This foundation positions me to continue advancing mechanistic and translational insights into GPCR and ion channel function while establishing an independent research program in Spain.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: MARIN MILLAN, EROS ALEJANDRO
Referencia: RYC2025-054627-I
Correo Electrónico: eros.marin@vhir.org
Título: Multi-Omics Approaches Applied to Immunomediated Inflammatory Diseases

Resumen de la Memoria:

My scientific career has been characterised by a multidisciplinary approach across molecular biology, immunology, metabolism, cell therapy and bioinformatics, applied to cancer, transplantation and autoimmune diseases, developed in academia and industry. I am co-author of six Q1 research articles (two as co-first author) and two reviews, with an h-index of 7 and 436 citations. I have presented my work at national and international meetings (eight oral presentations). In mentoring, I have supported master's students, undergraduates and staff in laboratory and analytical tasks. I contributed to preparing and delivering a course on tolerogenic dendritic cells at CHU Nantes. In outreach, I coordinate the Andorra territorial section of the Catalan Society of Biology, organising an oncology congress in 2022.

I started my research career in the Macrophage Biology Laboratory (Dr Celada & Dr Lloberas, University of Barcelona), acquiring experience in cell signalling, metabolism and animal experimentation. This work contributed to a Q1 publication in Cell Reports (2020) on Mitofusin I. I then pursued my PhD at the University of Nantes funded by Progreffe Foundation (supervision: Dr Moreau & Dr Cuturi), focused on tolerogenic dendritic cells in renal transplantation within the Phase I/II ONEstudy clinical trial. This resulted in a first-author Q1 publication in Cell Metabolism (2019) and a collaborative publication in Frontiers in Immunology (2022) on inflammatory bowel disease. After completing my PhD in 2018, I continued in the same group as Hospital Study Engineer until 2019.

I then joined the Kennedy Institute of Rheumatology (University of Oxford, Wellcome Trust) for my first postdoc, working on metabolomics, microscopy, bioinformatics and animal models in amino acid metabolism and germinal centre formation in lupus and leukaemia. This stage generated several Q1 articles, including Nature Immunology (2023, co-author), Science Metabolism (2024, co-first author), and Journal of Autoimmunity (2023). Afterwards, I worked in industry as Senior Scientist at Adaptimmune (Oxford), developing TCR-modified cell therapies for cancer, standardising techniques and building bioinformatics tools to support research pipelines.

I currently hold a postdoctoral position at VHIR (Dr Julià), focused on bioinformatics in immune-mediated inflammatory diseases (IMIDs) including lupus, inflammatory bowel disease and rheumatoid arthritis. My present research explores IMIDs using clinical and computational approaches. I contribute to the H2020 project "Dark-Matter" analysing genetic-PhIP-seq relationships. I also work on single-cell RNA-seq in pregnancy-associated rheumatoid arthritis, oral microbiome analysis in RA, and multi-omics studies in Sjögren's syndrome.

Resumen del Currículum Vitae:

I have developed a multidisciplinary research profile spanning molecular biology, immunology, metabolism, cell therapy, and bioinformatics, applied to cancer, transplantation, and immune-mediated inflammatory diseases (IMIDs), with experience in both academic and industrial settings. My scientific output includes six Q1 research articles, two as co-first author, and two review papers, with an h-index of 7 and 436 citations. Key publications include first-author work in Cell Metabolism (2019), co-first author in Science Metabolism (2024), and contributions to Nature Immunology (2023) and Cell Reports (2020). I have presented my research at national and international conferences, delivering eight oral presentations.

My academic training includes a PhD in Immunology and Transplantation at the University of Nantes, funded by the Progreffe Foundation, where I focused on tolerogenic dendritic cells in renal transplantation as part of the Phase I/II ONEstudy clinical trial. This work led to a first-author Q1 publication in Cell Metabolism (2019) and a collaborative publication on inflammatory bowel disease in Frontiers in Immunology (2022). After my PhD, I continued in the same group as a Hospital Study Engineer until 2019.

I then completed a postdoctoral fellowship at the Kennedy Institute of Rheumatology, University of Oxford (Wellcome Trust), working on metabolomics, microscopy, bioinformatics, and animal models to study amino acid metabolism and germinal centre formation in B cells in diseases such as lupus and leukemia. This stage resulted in publications in Nature Immunology (2023, co-author), Science Metabolism (2024, co-first author), and Journal of Autoimmunity (2023). Subsequently, I gained industrial experience as Senior Scientist at Adaptimmune (Oxford), developing TCR-modified cell therapies for cancer, standardizing experimental techniques, and building bioinformatics tools to support data analysis across departments.

Currently, I hold a postdoctoral position at Vall d'Hebron Institut de Recerca (VHIR), focusing on bioinformatic analyses in rheumatology and IMIDs. My projects include participation in the European H2020 project "Dark-Matter" investigating genetic-PhIP-seq relationships, single-cell RNA-seq studies in pregnancy-associated rheumatoid arthritis, oral microbiome analysis in RA, and multi-omics research in Sjögren's syndrome. I have also contributed to teaching and mentoring students and staff and to scientific outreach as coordinator of the Andorra section of the Catalan Society of Biology, organizing an oncology congress in 2022.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: SILVA ROJAS, ROBERTO
Referencia: RYC2025-054886-I
Correo Electrónico: roberto-s-rojas@hotmail.com
Título: Fisiopatología y Terapia de Enfermedades Musculares
Resumen de la Memoria:

My research path focuses on the understanding skeletal muscle physiology in health and disease and the development of developing therapeutic strategies for muscle disorders. I have authored 14 peer-reviewed publications and hold one patent, complemented by outreach activities in France and Spain.

I studied Biochemistry at the Universidad Complutense de Madrid and did my last year as Erasmus student in the University of Strasbourg. There, I pursued on a MSc on Molecular Biology and PhD on Life Sciences at the IGBMC under Dr. Johann Böhm. My PhD, which I could fund through a competitive PhD fellowship, focused on tubular aggregate myopathy and Stormorken syndrome (TAM/STRMK), multisystemic disease spectrum with skeletal muscle, spleen, platelet and skin involvement. I characterized a mouse model expanding TAM/STRMK disease presentation, and further identified molecular pathways (mitochondria, autophagy, protein folding) that are targetable using EMA/FDA-approved compounds. Additionally, I showed that targeting the Ca²⁺ channel Orai1 is a strong therapeutic hit for TAM/STRMK. I am co-inventor of a patent on shRNA for Orai1 silencing and showed that inhibition of the channel presents stronger therapeutic benefits. To translate the later, I could also establish a high-throughput drug screening, which recently identified a small set of EMA/FDA-approved compounds now been tested at the preclinical stage by my former lab (unpublished).

During my PhD, I also collaborated on projects identifying congenital myopathy mutations, performing Ca²⁺ imaging, and testing dynamin 2 silencing for centronuclear myopathy. My PhD experience spanned basic to translational research, grant writing, and mentoring three MSc students.

In 2022, I joined CNIC as an EMBO postdoctoral fellow in Jorge Alegre-Cebollada's lab within an ERC-funded team seeking to modulate protein mechanics in vivo. My skills on gene delivery and muscle mechanics and physiology were essential for the accomplishment of the ERC project goals. I facilitated the integration of advanced AAV capsids (MyoAAV) into CNIC's Viral Vectors Unit, enhancing gene delivery capabilities institute-wide, and allowing to modulate titin protein mechanics in cardiac tissues (under revision in PNAS). With my publication in Nature Biomedical Engineering as corresponding author I showed that modulating protein mechanics in vivo is possible. Interestingly, titin cleavage replicates pathological features of titin-related myopathies, revealing a mechanical fingerprint as a potential disease modifier.

I currently hold independent research projects aiming focused on titin and skeletal muscle physiology. First, I am interested by the correlation of muscle sarcomere homeostasis in muscle cell identity and their interaction with the innervating motor neurons. Second, mutations in the titin gene (TTN) are one of the most common causes of congenital myopathies. Here, I am benefiting from the mouse models that I have used or generated during my junior postdoc to screen molecules that blunt the molecular pathways affected or oligonucleotides that skip the affected exons. Among these models, there is a titin-related arthrogryposis multiplex congenita (AMC). I have obtained competitive funds for these independent projects and allowed me to mentor 1 PhD student (plus 1 looking for funding), 1 BSc and 1 MSc student.

Resumen del Currículum Vitae:

Driven by my passion for biomedical research and internationalization, I completed my BSc in Biochemistry (Universidad Complutense de Madrid) with an Erasmus year in the University of Strasbourg. There, I performed a MSc in Molecular Biology where my internship led to a PhD project on tubular aggregate myopathy (TAM) and Stormorken syndrome (STRMK), caused by STIM1/ORAI1 mutations. I obtained a competitive fellowship from Fondation pour la Recherche Médicale (102k€) and worked at IGBMC, a leading biomedical research institute in Europe. I characterized the first TAM/STRMK mouse model, revealing multi-organ defects (bone, immune system, spleen, platelets, skin) and redefined disease severity. Molecular studies uncovered mitochondrial loss, autophagy block, and ER stress, identifying druggable targets with EMA/FDA-approved compounds.

Later, I developed proof-of-concept therapies by reducing Orai1 expression and activity, improving disease features and leading to a patent on shRNA-driven Orai1 silencing. I also contributed to high-throughput drug screening for ORAI1 inhibitors, now in preclinical testing. Beyond TAM/STRMK, I collaborated on congenital myopathy genetics, Ca²⁺ imaging, and Dynamin 2 silencing for centronuclear myopathies. My PhD strengthened my expertise in translational research, grant writing, and training of students (3 MSc projects).

Postdoctoral Research in Madrid:

In 2022, I joined CNIC under Prof. Alegre-Cebollada with an EMBO fellowship (108k€) to study titin mechanics in muscle within an ERC-funded project. My main goal was to assess titin cleavage effects using TEVs-TTN mice and AAV-mediated TEV protease expression. I implemented muscle dynamometry, histology, ultrastructure, and transcriptomics, culminating in a study published in Nature Biomedical Engineering (2025), showing titin cleavage reproduces defects seen in titinopathies and unveiling a mechanical fingerprint as a disease modifier. I also contributed to a cardiac-focused project (in revision at PNAS) where we evidenced that titin cleavage triggers a rapid fibrotic response in the myocardium.

Currently, I lead projects on titin mechanotransduction in muscle differentiation and congenital titin-related disease (arthrogryposis multiplex congenita, AMC). I secured AFM-Téléthon grants (50k€ and 32k€) and supervise a La Caixa-funded PhD student. Preliminary data from these



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

independent research lines include the selection of a therapeutic avenue to target titin-truncating variants in disease, the potential myofiber-to-neuron crosstalk as a modulator of disease and the generation of a mouse model for titin-related AMC.

Overall, my trajectory combines basic and translational research, competitive funding, international mobility, and leadership including the setting of a strong collaborative network, and the recognition with a Ramon y Cajal postdoctoral fellowship will pave the way for an independent research position.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: NUEVO TAPIOLES, CRISTINA
Referencia: RYC2025-055351-I
Correo Electrónico: nuevo.tapioles@gmail.com
Título: Defining mitochondrial rewiring in cancer and rare diseases to reveal therapeutic vulnerabilities

Resumen de la Memoria:

My long-term goal is to uncover the mitochondrial mechanisms that sustain KRAS-driven tumors and identify metabolic vulnerabilities that overcome resistance. My research trajectory is defined by a sustained focus on how mitochondrial biology and dysfunction contribute to human disease, particularly cancer and rare genetic disorders. I began my career investigating mitochondrial bioenergetics, redox regulation, and OXPHOS organization, where I uncovered the phosphorylation-dependent regulation of IF1 and demonstrated that its inhibitory role extends beyond blocking ATP hydrolysis. This work reshaped the understanding of ATP synthase regulation and established the mechanistic foundation of my research profile. Building on this expertise, I investigated mitochondrial dysfunction in Charcot-Marie-Tooth disease, defining how impaired mitochondrial dynamics and metabolism contribute to neuropathy. This line of work led to a therapeutic screening platform, mechanistic insights into GDAP1-associated defects, and a granted patent for a potential treatment. These early studies consolidated my interest in linking mitochondrial biology with translational opportunities. My postdoctoral work broadened this framework to the field of oncogenic RAS. At New York University (NYU) School of Medicine, I integrate mitochondrial biology with cancer genetics, CRISPR functional genomics, metabolomics, and phosphoproteomics, to explore how KRAS mutations reshape metabolism and therapeutic response. I have demonstrated that KRAS4A engages mitochondrial metabolic enzymes and rewires cellular and tumor metabolism, revealing new interfaces between RAS signaling and mitochondrial function. In parallel, I initiated an independent research direction in RASopathies, identifying metabolic and mitochondrial defects in Costello Syndrome that pointed to novel therapeutic strategies. These complementary research lines converge on a central question: how mitochondrial rewiring enables disease onset and progression. My proposed research will extend this focus to therapy mechanisms of action and resistance by defining the mitochondrial traits of KRAS-driven colorectal cancer and uncovering the metabolic adaptations that drive resistance to RAS pathway inhibitors. Using mitochondrial phenotyping, metabolomics, and CRISPR-based genetic screens in cell lines and patient-derived organoids, the project aims to identify actionable metabolic vulnerabilities that can support more durable therapeutic strategies. Together, my past work and future research plan articulate a coherent, mechanistically grounded, and clinically oriented program at the intersection of mitochondrial biology, cancer metabolism, and RAS-driven disease, with the goal of translating metabolic insights into new therapeutic opportunities.

Resumen del Currículum Vitae:

My scientific career centers on understanding how mitochondrial function and cellular metabolism shape the development of cancer and rare genetic disorders employing cellular and mouse models. My research output includes 22 peer-reviewed publications (9 as first author, and h-index of 15), comprising 16 research articles, 4 reviews, 1 book chapter, and 1 protocol. I have participated in 22 conferences, delivering 8 talks and presenting 15 posters. I am co-inventor on 1 patent, and I have been awarded 4 competitive fellowships. I have also been certified by the ANECA as PAD, PCD, and PUP. Overall, my research trajectory has also made me a contributor at different levels in 7 Research Projects. My postdoctoral funding has progressively increased my scientific independence. The Postdoctoral fellowship from Comunidad de Madrid (60,000 €, 1.8 years) supported mentored postdoctoral research in Spain. Later, the Ramón Areces Foundation Postdoctoral fellowship (57,600 €, 2 years) supported advanced training in the United States. During this time, I further advanced my independence by co-leading an NIH R21 grant to study RASopathies (\$466,120, 2 years). In the last year, I have been awarded an Emerald Foundation Transition to Independence Award (\$300,000, 3 years) from which I am the only PI and aims to fund my own independent research line and career development toward an independent position in the US or Europe. In 2024, I was selected as a Leading Edge Fellow, a distinction awarded to ~40 outstanding U.S. postdoctoral researchers. This recognition includes participation in leadership and mentoring activities, including my contribution to the scientific organization and fundraising of the 2025 Leading Edge Conference. In 2025, I received the Early Stage Investigator Award from the RASopathies Network, which led to an invited oral presentation at the 9th International RASopathies Symposium, where I presented my work on mitochondrial dysfunction in Costello Syndrome. I maintain strong collaborations with Dr. Mark Philips and Dr. Pau Castel at NYU and with leading researchers including Drs. Alec Kimmelman, Kwok-Kin Wong, Eric Fischer, Eli Rothenberg, and Marielle Yohe. These collaborations span mitochondrial biology, cancer metabolism, RAS signaling, chemical biology, imaging, and translational oncology. Training and mentorship are central to my work. I have supervised 3 graduate, 2 master's, and 4 undergraduate students. My mentees have achieved competitive distinctions, including recognition in talent programs such as the Regeneron Science Talent Search in the US. I am committed to societal impact through public outreach, engagement with patient associations, and mentoring programs for middle-school students from underserved communities. I have served as Teaching Assistant for over 130 hours in Spain and the U.S. I also contribute to the scientific community as a journal reviewer, evaluator for funding agencies, and active member of professional societies (AACR, EACR, GWIS, ASEICA, ECUSA). Together, these achievements position me to establish a competitive and internationally connected research program in Spain, advancing mitochondrial biology toward meaningful clinical impact.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: FENAROLI, FEDERICO
Referencia: RYC2025-054442-I
Correo Electrónico: federico.fenaroli@uis.no
Título: Nanoparticle drug delivery using zebrafish embryos

Resumen de la Memoria:

The expertise of the candidates lies in nanoparticle treatment of cancer and bacterial infections using the zebrafish. On these two topics there is a lot of room for development of new research.

1) Regarding cancer. In the recently awarded grant "Development of targeted lipid nanoparticles enclosing miRNA for the treatment of HER2-positive breast cancer", much of the work is concentrated in vitro on cultured cells and in the zebrafish on xenotransplanted cancer cells forming solid tumors. In both cases the main aim is to observe and quantify the delivery of nucleic acids in HER2 positive cells. If given the opportunity, the candidate would like to develop this further and explore a fascinating aspect of zebrafish xenotransplants, namely that of circulating tumor cells. A growing number of publications since 2013 (notably Follain et al. 2018 Developmental Cell) has shown that the zebrafish is particularly suited to assess the events of cancer cell intravasation, blood circulation and extravasation. Since preventing circulating tumor cells from spreading and forming micrometastases is a major challenge in cancer treatment, the candidate aims to use the zebrafish model to evaluate whether lipid nanoparticles targeting HER2-positive cells can bind, internalize, and release their nucleic acid cargo into circulating breast cancer cells that overexpress HER2. The candidate thinks this is both feasible and with higher chances of success than treatment of solid tumors. These are rather compact and nanoparticles can have direct access to them increasing the chances of binding and internalization. Thanks to its optical transparency which allows high resolution live imaging, the zebrafish embryo is the only in vivo system where binding/internalization of nanoparticles into circulating tumor cells can be visualized and quantified.

2) Regarding bacterial infections. The candidate has extensive experience treating Mycobacterium marinum and Staphylococcus aureus infections in zebrafish using drug-loaded nanoparticles. If given the opportunity, he would like to explore a new and increasingly relevant topic with strong potential for combating antibiotic-resistant bacteria: phage therapy. Lytic bacteriophages, which are viral particles typically 20-300 nm in size, can be considered natural nanoparticles with the unique ability to replicate upon infecting their host. Only a few studies have addressed phage therapy using zebrafish, leaving many avenues open for investigation. One area of particular interest is the interaction between phages and the innate immune system. Transgenic zebrafish lines with fluorescently labeled macrophages or neutrophils are available and can be combined with fluorescently labeled bacteria to visualize host-pathogen dynamics, as demonstrated in several zebrafish disease model publications. Furthermore, bacteriophages themselves can be labeled either by attaching fluorescent dyes or by engineering them to express fluorescent proteins on their capsid. This approach would enable studies that are challenging in mouse models, such as assessing the ability of different phage strains to access extracellular and intracellular bacteria.

Resumen del Currículum Vitae:

I began my academic career with a Master's degree in Industrial Biotechnology at the University of Milano-Bicocca, followed by a second Master's in Biomedical and Biomolecular Science at University College Dublin. During this time, I joined the laboratory of Prof. Kenneth Dawson, where I started working on nanoparticles (NP), focusing on the "protein corona" the selective binding of blood proteins to NP and its impact on cellular uptake. This research allowed me to gain expertise in electron microscopy and resulted in my first three publications, two as joint first author (ACS Nano, Molecular Biosystems).

I then pursued a PhD in the laboratory of Prof. Gareth Griffiths at the University of Oslo, shifting my focus to developing zebrafish embryos as a model for NP research. At that time, zebrafish were not used in this context, offering an opportunity to create a unique niche. Despite Prof. Griffiths having no prior zebrafish experience, I successfully established the model and applied it to study NP in the context of tuberculosis (TB), leading to a key publication in ACS Nano (Fenaroli et al., 2014). After completing my doctorate, I continued as a postdoc in Griffiths' lab, gaining full responsibility for research direction and collaborations. While TB remained a focus, resulting in further ACS Nano publications (Fenaroli et al., 2018; Fenaroli et al., 2020), I expanded into cancer research. I co-authored the first paper on zebrafish xenotransplants and NP (Evensen et al., Nanoscale 2015), then pioneered the use of the neural tube as an injection site for transplanted cancer cells, enabling robust growth and angiogenesis. This innovation led to two last-author publications (Van Driessche et al., Chemistry of Materials 2018; Kocere et al., EBioMedicine 2020) in collaboration with NP experts groups, Prof. Giuseppe Battaglia and Prof. Bruno De Geest. Further collaborations included Matthias Barz (Leiden), providing NP for comparative blood circulation studies in zebrafish and mice, which revealed strong cross-species correlations (Dal et al., Small 2020). I also wrote as co-applicant a successful grant (800k euro) that funded my research and that of a PhD student, Nils Dal, whose work on Pretomanid derivatives for TB treatment resulted in 10 publications including the main one of his doctorate (Dal et al., Journal of Controlled Release 2023).

Recently, I started to work with another group focused on nanomedicines, that of Prof. Molly Stevens (Imperial College London). This collaboration led to a publication in Advanced Materials (Creamer et al., 2023). This study was the first to quantify, in a living vertebrate, the fraction of HER2-targeted NP reaching cancer cells, a feature difficult to obtain in other animal models.

In October 2022, I joined the University of Stavanger as Associate Professor, where I am establishing a zebrafish-based research group. In 2024, I was awarded Norway's most competitive grant, FRIPRO (€1M), for the project "Development of targeted lipid nanoparticles enclosing miRNA for the treatment of HER2-positive breast cancer". It is a collaborative project involving the Stavanger University Hospital and international collaborators.

To date, I have published 33 articles and one book chapter, with 7 as first/joint first author and 5 as last/joint last author. My work has been cited 3,280 times, with an h-index of 21.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: CODA, DAVIDE MARTINO
Referencia: RYC2025-055675-I
Correo Electrónico: davidecoda88@gmail.com
Título: An epigenetic journey from cellular to behavioural memories

Resumen de la Memoria:

I have a long-standing interest in epigenetics, which drove me from studying cellular memories during development to investigate behavioural memories in the adult brain.

First, at the University of Turin, I worked at the forefront of investigating the epigenetic underpinnings of rhabdomyosarcoma (RMS), a childhood tumor where the myogenic differentiation process has gone awry. Using an advanced combination of molecular tools and tumorigenic assays, I identified two miRNAs-mediated mechanisms that are crucial to overcoming the differentiation block in RMS, positing the way for new epigenetic-based therapies in the treatment of this tumor. Next, during my PhD in Dr. Caroline Hill's lab at the Francis Crick Institute, I addressed how signal-activated transcription factors (TFs) perpetuate distinct cell states in response to specific extracellular stimuli. To this goal, I focused on the NODAL/Activin signalling pathway, which is essential for embryonic development and pluripotency. Combining next-generation sequencing technologies with candidate loci interrogation, I showed that the SMADs – the ligand-inducible TFs downstream of the pathway – orchestrate transcriptional programmes by remodelling the chromatin template. In parallel, I employed state-of-the-art footprinting techniques in conjunction with enhancer-bashing experiments to uncover the network of TFs that underlies SMADs binding to DNA and mediates its transcriptional activity over time. Altogether, I delineated the sequence of events that occur on chromatin in response to NODAL/Activin ligands, equipping the stem cell and developmental biology communities with new paradigms for signal-dependent transcriptional regulation.

Once acquired a solid knowledge of the epigenetic mechanisms linking gene expression and extracellular cues, I shifted my interest towards the system where these interactions occur at its highest level of complexity: the adult brain converting temporary external stimuli into long-lasting changes. In the brain, epigenetic modifications have for long been proposed to act as molecular memory aids, but a causal demonstration thereof has been lacking. Fascinated by this question, with a HSFP postdoctoral fellowship I joined the lab of Prof. Johannes Gräff at EPFL. Here, leveraging cutting-edge sc-omics, transgenic mouse models and neuroepigenome editing technologies, I provided a proof-of-principle that the epigenetic makeup of a single site on the genome can guide learnt behaviours. Given its modular set-up, similar approaches may in future prove useful to better understand other phenotypes from the perspective of cell and locus-specific epigenetic regulation, both within and outside neuroscience.

More recently, I started my independent research agenda, and I moved my focus from studying behavioural memories within individuals to memories across individuals. Learning from others' experiences sits at the cornerstone of social species evolution and survival, including humans and rodents. Yet, the molecular mechanisms underlying it are largely unknown. Empathic Epigenetics – the project I propose to carry out as an independent group leader – posits the pioneering hypothesis that the adult brain might use the chromatin template as a molecular substrate to store and encode socially transmitted information.

Resumen del Currículum Vitae:

I am a passionate, open-minded scientist with more than 15 years of research experience within highly demanding institutions.

I studied Medical Biotechnology at the University of Turin, obtaining my bachelor and master degrees with highest grades in 2010 and 2012. At the same time, I trained as a scientist in Prof. Riccardo Taulli's lab, which investigates the epigenetic mechanisms underlying rhabdomyosarcoma (RMS). There, I developed an interest in the role of the epigenetic factor SMYD1 and the metabolic enzyme G6PD in the pathogenesis of RMS, which resulted in an article in Cell Cycle where I am the first author. In parallel, I collaborated on a project published in the journal Oncogene on the importance of chromatin remodelling to overcome the differentiation block in RMS. My achievements as an outstanding student were recognized with the Menzione Optime prize and with a scholarship for the 1st Summer School in Medical & Biosciences Research & Management, held in Athens in 2012.

In 2013, I started a fully-funded PhD in Dr. Caroline Hill's lab at the Francis Crick Institute. In January 2018 I successfully defended my thesis entitled NODAL/Activin signalling to chromatin: mechanisms of SMAD2-regulated transcription, and I extended my stay in the lab as a postdoc until December 2018. During my time at the Crick, I acquired extensive experience in the generation and the analysis of complex -omics datasets (I was selected for a bioinformatics course at the Okinawa Institute of Science and Technology); delivered two high-impact publications as first author (Elife and Journal of Cell Science); and presented my work as a speaker at the 5th Epigenesis Annual Meeting.

As of May 2019, I have been part of Prof. Johannes Gräff's lab at EPFL as senior postdoc, building my path towards becoming an independent group leader in the field of neuroepigenetics. After securing myself the prestigious HFSP Long-Term Fellowship, by engineering a spatiotemporally inducible CRISPR-based epigenetic editing system I provided the first causal evidence that locus-specific epigenetic modifications are necessary and sufficient to drive memory expression in a reversible manner. This work was published in Nature Genetics accompanied by a commentary by Dr. Elizabeth Binder, and was extensively covered by the mass media, including interviews on the Swiss radio as well as Swiss, French and Italian newspapers. More recently, as senior last author I co-led a follow-up study now available in Hippocampus.

While at EPFL, I also wrote two review articles on the epigenetic underpinnings of memory and cognitive health (Frontiers in Molecular Neuroscience, Current Opinion in Neurobiology); established a collaboration with Prof. Dominik Niopek's lab at the University of Heidelberg to develop CRISPR systems for the optogenetic deactivation of transcription (which resulted in a paper in Nucleic Acids Research); had the honor to be selected as a speaker at six international conferences; and served as ad hoc reviewer for several high-impact journals. Finally, as part of my teaching and mentoring activities, I directly supervised two visiting PhD students and five MSc students (now enrolled in prestigious PhD programs); taught neuroepigenetics classes at the master level; and participated as an instructor at the 2022 Course in Neuroepigenetics by the Cajal School of Neuroscience.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: CLOTET FREIXAS, SERGI
Referencia: RYC2025-054970-I
Correo Electrónico: sclotet88@gmail.com
Título: Investigador independiente junior en nefrología básica

Resumen de la Memoria:

Despite the well-recognized sex dimorphism in kidney diseases, the biological differences that underpin these observations are poorly understood. Through my career, I have significantly contributed to fill this knowledge gap.

My PhD work at Hospital del Mar in Barcelona shed new light on the effect of sex in diabetic kidney disease (DKD). The work unveiled that male sex is associated with a more severe progression of DKD in type 1 diabetic mice (Clotet-Freixas S, et al., Lab Invest, 2018). We also demonstrated that the deleterious effects of male sex in DKD in vivo are not observed in the absence of androgens (Clotet S, et al., J of Hypertension, 2016).

My PhD was supported by a PFIS fellowship of the ISCIII, which also covered a 6-12-month rotation abroad. In 2015, I conducted the international PhD rotation at the University Health Network of Toronto (Canada), under supervision of Dr. Ana Konvalinka and Dr. James W. Scholey, that was a game-changer for my PhD and scientific career. During the rotation I applied advanced proteomics methods and determined that energy metabolism was the top cellular process altered by androgens in male-derived kidney cells. We identified androgen-induced upregulation of enzymes involved in the metabolism of glucose and glutamine, which are fundamentally linked to DKD. The work was published early in my postdoctoral studies (Clotet S, et al., Molecular & Cellular Proteomics, 2017).

As a culmination of my postdoc in Canada, I undertook an innovative approach by including the sex of the kidney cell as a major study variable. I demonstrated that male kidney cells are more glycolytic and oxidative than female cells, and that these changes relate to fundamental sex differences in the kidney metabolism of glucose, glutamine, and pyruvate. In collaboration, we validated our main experimental observations in a cohort of patients with type 2 diabetes and their healthy controls (Clotet-Freixas et al., Science Translational Medicine, 2024). The clinical and social relevance of such discovery were discussed in the Research Highlight of Nature Reviews Nephrology (2024, <https://www.nature.com/articles/s41581-024-00832-2>), and the work was featured in several research institute websites, as well as media platforms for the broader audience.

As an emerging independent investigator, I have developed a scientific program that relies on the sex-specific study of metabolic pathways and their regulation by sex-related factors, in normal kidney physiology and in native and transplant kidney diseases. We particularly focus on the molecular study of DKD and acute kidney injury (AKI), given the high prevalence, sex-based pathophysiology, and metabolic nature of both diseases. In the lab we couple state-of-the-art omics methods with cell biology and biochemistry approaches, to identify novel therapeutic targets in DKD and AKI.

My goal in the next 5 years is to identify sex-specific mechanisms of kidney cell metabolic dysfunction that can be targeted to prevent DKD and AKI. My team is mechanistically focused on the role of two different factors encoded on the X chromosome, namely histone demethylase KDM6A and AR, as transcriptional regulators of kidney cell dysmetabolism and injury and potential therapeutic targets in DKD and AKI, respectively. Each of my two graduate students are focused on each of the two proteins.

Resumen del Currículum Vitae:

I am a basic scientist with expertise in the study of sex differences, cell biology, kidney disease, and diabetes. I graduated from my Biological Sciences Bachelor at the Universitat Autònoma de Barcelona (Spain, 2010) and obtained my MSc Degree on Biomedicine at the Universitat de Barcelona (Spain, 2012). Next, I completed a PhD in basic nephrology at the Hospital del Mar Research Institute of Barcelona (2016), where I trained under supervision of Dr. Julio Pascual and Dr. Maria J. Soler. Since then, my main research goal has been identifying the reasons behind the sex-specific progression of metabolism-driven kidney diseases, with a focus on diabetic kidney disease and post-transplant acute kidney injury.

I hold 25 peer-reviewed publications encompassing 21 research papers, 3 reviews, and one editorial (all of them open access). Of these 25 publications, I am the first or co-first author on 11 of them, and the senior or co-senior author on 2 of them. These publications include papers at top tier journals such as Science Translational Medicine (1), Nature Communications (3), Molecular and Cellular Proteomics (2) and JASN (2). At the level of conference participations, I have been an invited speaker to two international conferences (Canada and USA). I have delivered 9 additional oral communications and 20 posters.

Upon completion of my PhD in 2016 (Barcelona), I returned to Canada to work as a post-doctoral fellow in the laboratory of Dr. Konvalinka at the University Health Network of Toronto (2016-2023). I included the sex of the cell as a principal study variable, which led to the discovery of fundamental sex differences in the metabolic function, cell metabolome and metabolite fluxes of kidney cells (Clotet-Freixas S, et al., Science Translational Medicine, 2024). My postdoctoral training in Canada was the most prolific time of my career. With Dr. Konvalinka, we published 11 peer-reviewed manuscripts, most of them in top tier journals.

The cumulative evidence emerging from my work and linking sex-specific mechanisms kidney cell dysfunction to clinical outcomes set the stage for the start of my independent research program at McMaster University in Canada (2023-present). This position has enabled me to attract project and infrastructure funding as independent investigator, recruit two graduate students, and participate in two PhD committees involving members of different countries and research institutions. In 2017, I served as the international committee member for the PhD defense of Vanesa Palau (Hospital



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

del Mar Research Institute, Barcelona). More recently, I have started to serve as judge at the evaluation committee of a PhD candidate at McMaster University (Canada).

In terms of funding, I have been able to consistently attract competitive salary support during my PhD training (PFIS fellowship of the Instituto de Salud Carlos III), and as a postdoc and new investigator (Kidney Foundation of Canada). As postdoc, I obtained external project funding from the Canadian Institute of Health Research (225,000 CAD (approximately 140,000 EUR); 2018-2021)), through a grant on which I was a co-applicant with Dr. Konvalinka. Since the start of my first appointment in 2023, I have independently attracted a total of 475,000 CAD (approximately 295,000 EUR) in competitive project and infrastructure funds as nominated principal applicant.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
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Referencia: RYC2025-054555-I
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Título: Integrating statistical genetics and functional models to decipher the polygenic basis of psychiatric and complex traits

Resumen de la Memoria:

My career in human genetics has been defined by curiosity, interdisciplinary exploration, and a drive to understand how genetic variation shapes complex traits, particularly psychiatric disorders. Beginning in Spain, I gained my first research experience in bioinformatics during my undergraduate studies, contributing to the characterization of inversions in the chimpanzee genome. My first international experience came as an Erasmus Fellow in Finland, where I analyzed gene expression in patients with first-episode psychosis, uncovering immunomodulatory effects of antipsychotic treatment and sparking my interest in psychiatric genetics.

I moved to the UK to pursue an MSc at King's College London, applying polygenic risk scores to antidepressant response across 29 cohorts, demonstrating that genetic predictors of treatment response differ from disease susceptibility. This work, my first first-author publication, cemented my interest in translating genomic data into clinically relevant insights. For my PhD at Queen Mary University, I combined statistical genetics and experimental models, showing that smoking amplifies the effect of polygenic risk for depression on psychotic experiences using UK Biobank and 23andMe data. To explore causality, I leveraged zebrafish, establishing CRISPR/Cas9 genome editing to study psychiatric risk genes. I identified SLIT3 as a regulator of nicotine preference, validated in humans, and characterized RBFOX1, ANKK1/DRD2, and DISC1, revealing conserved pathways modulating behavior and neurodevelopment. These studies demonstrated how human genomics can guide experimental models and vice versa, laying the groundwork for NIH-funded projects on addiction and psychiatric disorders.

In 2020, I joined Mount Sinai in New York as a postdoctoral researcher, integrating computational and experimental approaches to advance polygenic risk modeling. I co-developed PRSet, a pathway-based method mapping risk to biological pathways, and contributed to BridgePRS, improving prediction across ancestries. I also co-authored a Nature Genetics Perspective on polygenic, omnigenic, and stratagenic models of complex disease risk. Complementing these methods, I examined functional architecture of complex traits, creating tools to visualize variant effect size versus frequency and mapping tissue- and cell-type-specific expression of disease genes.

Throughout my career, I have demonstrated leadership and mentorship, securing over \$1 million in competitive funding as PI, guiding students and interns to publishable research, and fostering international collaborations. I co-founded the Genomics Preprint Club to promote open science and have contributed to initiatives supporting women and early-career scientists.

Looking forward, my independent research program will integrate statistical genetics and functional genomics to capture polygenic disease mechanisms. We will stratify patients into genetically and clinically homogeneous subgroups using pathway-based polygenic risk scores and clinical data, and leverage iPSC models to test how individual genetic burden shapes cellular phenotypes. By combining these approaches, my lab seeks to advance mechanistic understanding of complex traits, improve experimental design, and guide translational applications in psychiatric and other polygenic disorders.

Resumen del Currículum Vitae:

I am a human genetics researcher at the Icahn School of Medicine at Mount Sinai (New York City, USA). My work investigates how genetic effects combine to generate complex disease risk, with particular emphasis on psychiatric disorders. I have approached this topic from multiple angles; from statistical genetics in human cohorts to behavioral studies, pharmacology, and genetic engineering in animal models.

I have pursued my career entirely abroad, building a strong international network of collaborators. I completed my MSc and PhD in the UK, at King's College London and Queen Mary University of London. During my predoctoral research, I pioneered early work on polygenic prediction of antidepressant response, examined the interplay between psychiatric genetic risk and smoking, and demonstrated the utility of zebrafish for functional follow-up of disease-associated genes, producing 12 publications, six as first author. This training provided me with expertise in both wet lab and computational methods and shaped my approach to integrating large-scale human studies with functional research to understand disease mechanisms.

As a postdoctoral researcher in Dr. Paul O'Reilly's lab at Mount Sinai, I applied this interdisciplinary skillset to develop novel methods for calculating polygenic risk scores. I secured over \$1 million in competitive funding as PI, including the 2022 Brain and Behavior Research Foundation Young Investigator Grant (NARSAD) and a K99/R00 NIH Pathway to Independence Award. My work has led to five first-author publications in high-impact journals, including Nature Genetics and PLOS Genetics, and my first senior-author publication.

Beyond research, I am committed to supporting early-career scientists. In 2018, I organized #CienciaUK18 to connect young researchers with leaders across academia, industry, and science policy. I recently led an event at the New York Academy of Sciences to support women scientists pursuing non-academic careers. In 2019, I conducted a study on gender-equality perceptions in research, highlighting clear differences between men's and women's views; this work, published and cited over 130 times, was presented to stakeholders in Madrid. For these contributions, I received the 2023 Women in Science Award at Mount Sinai.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I actively contribute to the scientific community as a peer reviewer for Nature, Nature Communications, and Biological Psychiatry, and as an editor for BMC Genomics and Frontiers in Molecular Neuroscience. I co-founded the Genomics Preprint Club to promote open science through community-driven peer review, and as Director of Communications for the Society of Spanish Researchers in the UK, I led a team to increase the visibility of Spanish science.

My interdisciplinary research, combined with a commitment to mentorship and civic engagement, provides a strong foundation to establish a leading research program in Human Genetics and Genomics in Spain.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Biomedicina
Nombre: IRIONDO MARTINEZ DE ZUAZO, OIHANA
Referencia: RYC2025-056358-I
Correo Electrónico: oihana315@gmail.com
Título: Phenotypic adaptability in tumor progression and response to therapy

Resumen de la Memoria:

My research focuses on the study of how tumor cells can adapt to different challenges exerted by the microenvironment during tumor progression. Accumulation of genomic aberrations leads to tumor heterogeneity, which is a key contributing factor to cancer progression and resistance. However, it has become increasingly apparent that reversible transcriptional changes also have a major role in the diversity of phenotypes found within a tumor. Such phenotypic plasticity is especially advantageous for cancer cells when their environment imposes profound constraints for tumor growth, and the need of rapid and dynamic adaptability becomes key for the survival of cancer cells. During the different stages of my career, I have studied different situations in which cancer cells need to adapt to challenges placed by their microenvironment, and how this influences tumor progression. My main PhD project focused on investigating the effects of hypoxia in the cancer stem cell (CSC) content of breast tumors. We discovered that hypoxia enhances the self-renewal capacity of CSCs and leads to the de-differentiation of non-CSC, and we identified the mechanisms involved. During my postdoctoral studies at USC, we discovered how the expression of a protein kinase named TAK1 increases the capacity of tumor cells to form metastases, by functioning as a communication hub that integrates signals coming from different cells of the microenvironment, and we performed proof-of-principle experiments showing that a nanoparticle-encapsulated TAK1 inhibitor can reduce metastasis formation in triple negative breast cancer mouse models. In a second project, we described how hypoxia leads to the downregulation of interferon (IFN) target genes in vitro and in vivo. Interestingly, we found that transient exposure to hypoxia can lead to a "cellular memory" that sustains low levels of IFN signaling, alterations in the tumor microenvironment, and tumor progression, and that hypoxia-induced long-term suppression of IFN signaling can be reversed by using epigenetic drugs. Since I joined the laboratory of Dr. Arkaitz Carracedo, I have been working on a project that seeks to understand the adaptive mechanisms that allow cancer cell survival in early phases of the anticancer treatment. While some tumors already have clones with resistance conferring genetic alterations, in many cases resistance is acquired during the treatment. Recent research has shown that some cancer cells can survive treatment by reversibly reprogramming their transcriptomes to a slow-cycling drug-tolerant persister (DTP) cell state. With time, persister cells can acquire further genetic alterations leading to bona-fide resistance. Understanding the molecular properties of drug-tolerant persister cells and the adaptability mechanisms that allow some cancer cells to acquire those properties will facilitate the development of therapeutic strategies that will prevent or limit the development of therapeutic resistance and tumor recurrence. In this sense, I plan to develop my future research centered on the idea that stress-induced plasticity and transcriptional heterogeneity are essential for tumor cells to rapidly adapt to environmental insults, to find therapeutic approaches that by limiting the adaptive capacities of cancer cells, will lead to more durable responses.

Resumen del Currículum Vitae:

My career in cancer research has been dedicated to studying the role of cell plasticity and the tumor microenvironment in cancer progression. During my PhD at CIC bioGUNE, I studied the effect of hypoxia in breast cancer stem cells (CSCs) and participated in projects at the intersection of CSCs, steroid hormones and therapy resistance. As a result, I published three research papers, including one as first author (Iriondo O, 2015a) and one book chapter (Iriondo O, 2015b). Then I joined Dr. Min Yu's lab at the University of Southern California (USC). My time in USC was transformative. I published three articles as first author and co-authored other three studies. My main work included i) a study published in Nature Communications showing how the protein kinase TAK1 promotes breast cancer metastasis to the lung by integrating signals from the microenvironment (Iriondo O, 2018), and ii) a study about the regulation of interferon signaling by hypoxia, dissecting mechanistic aspects and analyzing the consequences in tumor progression, which has recently been published in Cancer Research (Iriondo O, 2024). As a reflection of my leading role in the conception and execution of this last project, I am both the first and a co-corresponding author in this publication. In addition, I set up and optimized molecular analyses of Circulating tumor cells (CTCs) (collaboration published in Cancer Discovery) and contributed to the development of methods for isolating live single CTCs and improving their expansion in culture (collaborations published in Scientific Reports and Developmental Cell. My work has been presented in national and international conferences, including the Annual AACR Meeting (2017-2019), the HypoxEU network meeting (2022), and the Annual Meeting of the Spanish Hypoxia Research Group hypoxiaNET.es (2024), in which I was the Keynote speaker. Over the course of my career, I have worked with a multidisciplinary group of collaborators and have mastered state of the art techniques such as single cell RNA sequencing and in vivo modelling of tumor progression. In addition, I developed essential abilities of independent, critical, and creative thinking, and acquired mentoring skills by training and supervising four technicians and two master students and coordinating and leading a small group of scientists during the last 2 years of my postdoctoral stay. In 2024, I started training and supervising my first PhD student, whose thesis will be co-directed by Dr. Arkaitz Carracedo and myself. Throughout the years, I have been able to secure independent funding to develop my research based on my academic and scientific achievements. Early in my career I was granted a PhD Fellowship by the Basque Government; in 2019 I was awarded a grant by the Eli and Edythe Broad Foundation to continue my work as a research associate at USC; in 2022 I received an Ikerbasque Research Fellowship, which is part of a tenure-track program funded by the Basque Foundation for Science to support the transition to a fully independent position. Being awarded with a Ramón y Cajal grant would represent an enormous impulse in my transition to independence, increasing my competitiveness to obtain funding in national and international calls and to contribute to advances in cancer research that will significantly improve patient outcomes.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: MARÍN GARCÍA, PABLO JESÚS
Referencia: RYC2025-054313-I
Correo Electrónico: Pabmarg2@gmail.com
Título: Optimizing the Ideal Protein Concept through omic Sciences Applied to Animal Production and Conservation in a Climate Change Scenario

Resumen de la Memoria:

As part of my academic training at the Polytechnic University of Valencia (UPV), I developed a multidisciplinary background that spans agricultural engineering, environmental science and several postgraduate programs in animal conservation, production and education. During my PhD period at UPV, my work centered on livestock nutrition, where I applied metabolic markers to refine amino acid requirements in growing rabbits. From there, my research trajectory expanded beyond its initial focus through extended stays in leading European research groups, including the Gut and Host Health group (GHH) and the Ruminant Nutrition group (RUN), both at Aarhus University (AU) in Denmark, under the supervision of Dr. Skou-Hedemann and Dr. Larsen, respectively. These experiences allowed me to incorporate both targeted and untargeted metabolomics and pushed my work toward a more molecular and mechanistic understanding of animal nutrition. Over time, my research broadened to multiple species—including poultry, pigs and various wildlife—through other research stages, collaborations and projects with institutions such as the University of Padova, Institute of Agrifood Research and Technology, the Universities of Seville and Córdoba, the Patagonian Ecosystem Research Center in Chile, and the University of San Francisco de Quito in Ecuador, among others. Currently, as a Full Professor at CEU Cardenal Herrera University, I lead the NUCOPRO group, where I apply integrative, multi-omic approaches to address sustainability and efficiency challenges in modern animal production systems. As a Ramón y Cajal researcher, I would like to extend my work toward a line entitled "Optimizing the ideal protein concept through omic Sciences Applied to Animal Production and Conservation in a Climate Change Scenario", hypothesizes the existence of interspecific molecular mechanisms influenced by the quality and quantity of protein intake, which may induce shifts in metabolomic phenotypes. These shifts could reveal biomarkers that enhance precision nutrition within the ideal protein framework, thereby advancing both animal production and conservation efforts. Thus, the general objectives will be: (i) Characterize metabolomic profiles of various livestock and wild species in response to different protein sources and dietary formulations, aiming to identify key metabolites that influence animal production and strengthen conservation strategies. (ii) Develop biomarkers, identifying and validating specific indicators associated with optimal protein utilization, metabolic efficiency, and their underlying molecular mechanisms. (iii) Integrate multi-OMIC technologies and species, combining transcriptomic, develop a holistic understanding of how protein metabolism affects animal success and to identify potential interspecific responses. (iv) Investigate the effects of climate change on protein metabolism, aiming to identify resilient protein sources and adaptive metabolic pathways. This research line aims to establish a global reference by expanding a metabolomic database from over 1,500 metabolomes across 23 species to 7,000 individuals from 100 species, integrating multiple OMIC techniques. By adopting a multidisciplinary approach, it will identify common metabolic responses and interspecific patterns, thereby enhancing scientific impact in both animal production and conservation.

Resumen del Currículum Vitae:

Dr. Marín-García holds 2 bachelor's degrees—Agricultural Engineering (2010) and Environmental Science (2012)—both with honors from the Polytechnic University of Valencia (UPV). They have completed 3 master's degrees—Animal Conservation (UV), Animal Production (UPV), and Teaching (UV), all with distinction. The candidate obtained their Ph.D. in 2019 at UPV, with a Cum Laude distinction and International Mention. He is the principal investigator (PI) of the "Nutrition: Production and Conservation" research group, specializing in multi-omics approaches in animal production and conservation. The candidate has published 121 scientific contributions, including 63 papers in SCI journals (83% in Q1), 37 conference abstracts (80% as first author), 5 invited talks and 7 edited books. His work has an h-index of 16, with 806 citations. He has been PI in 14 projects (€429,900), lead tasks in 3 (€4.26 M), and collaborator in 15 (€11.34 M). He has been PI of 4 metabolomics projects with industry (€16,888), collaborator in 6 industry contracts (€41,762), Technical Expert Evaluator for R&D (€13,390), and PI for 9 private sector projects (€130,000). Since completing his PhD, he has been 3 years and 4 months conducting research at four prestigious international centers, including Aarhus University, contributing to 26 papers with global collaborators and leading a network of 31 institutions. The candidate has taught over 3,200 hours across various degrees, supervised 18 undergraduates, 8 MSc students, and 3 PhDs.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: LUTFI ROYO, ESMail
Referencia: RYC2025-056553-I
Correo Electrónico: esmailroyo@gmail.com
Título: Sustainable and Innovative Ingredients for European Aquaculture: Protein, Lipid, and Functional Components for Enhanced Fish Health and Product Quality

Resumen de la Memoria:

The document outlines a scientific career centered on fish physiology, lipid metabolism, and aquaculture nutrition, characterized by a steady progression from mechanistic laboratory research to applied, industry-oriented innovation. The candidate has produced 45 publications, including 28 peer-reviewed articles, most in high-ranked journals, and multiple technical reports for funding bodies and industry partners. Their work has gained significant visibility, with close to 1.000 citations and an h-index around 18. They have also presented more than 50 conference communications and consistently apply FAIR principles and structured data management. A major part of the contribution lies in developing technical methodologies, such as pioneering primary subcutaneous adipocyte cultures from Atlantic salmon, contributing to CRISPR delivery systems in salmon eggs, and implementing hyperspectral imaging and Raman-based fatty acid profiling. These tools enabled new experimental frameworks, mechanistic studies, and practical solutions for aquaculture challenges. Their research focuses on linking molecular physiology with the needs of the aquaculture industry, illustrated by work on omega-3 requirements in salmon, mechanisms behind fillet color variation, and applied projects such as identifying the pigment responsible for green liver discoloration in cod.

Selected studies demonstrate expertise in adipocyte biology, dietary modulation of lipid metabolism, functional ingredients, genotype-linked metabolic strategies, probiotic effects on appetite regulation, and large-scale feeding trials showing that higher EPA and DHA improve growth, welfare, and product quality in salmon. Industry-oriented outputs include validated imaging tools for estimating liver fat and conclusive biochemical clarification of liver greening in cod. International mobility has been extensive, with research stays in France and Italy and long-term experience in Norway. These periods provided training in zebrafish models, nutritional programming, microbiome research, and large sea-cage experiments. The candidate has built a wide global network, engaged in European consortia, taught at multiple universities, and supervised numerous students. More than half of their publications involve international collaborators. Leadership development is evident through roles as principal investigator, work-package leader, and contributor to over 30 projects. They have secured substantial research funding, coordinated complex samplings, led multi-partner scientific outputs, and engaged actively with aquaculture stakeholders through outreach, media visibility, and knowledge-transfer activities. Their mentoring record, editorial roles, and involvement in organizing international conferences further reflect scientific independence. The proposed future research line focuses on sustainable feed innovation through three pillars: using underutilized marine biomass (e.g., mussel-based ingredients), valorizing lipid co-products from processing industries, and developing natural antioxidants to replace synthetic ingredients. These topics aim to enhance circularity, nutritional quality, and fish health. The approach integrates mechanistic assays, multi-omics tools, and commercial-scale validation to generate practical, environmentally responsible feed solutions for modern aquaculture.

Resumen del Currículum Vitae:

The CV describes a career built on a strong academic foundation in biology and aquaculture, marked by early distinctions, international mobility, and a steady progression toward independent, industry-relevant research. The path began with a BSc in Biology and an early scholarship that introduced the candidate to aquaculture. A subsequent MSc in Aquaculture, completed with an Extraordinary Mention award, and a Postgraduate Certificate in Education provided both scientific depth and teaching skills that supported long-term involvement in university instruction and student guidance. A competitive fellowship enabled entry into a laboratory specializing in fish physiology, where expertise in primary cell cultures and molecular techniques expanded. The author then completed a PhD in Biology/Aquaculture focused on metabolism and adipose tissue biology in fish, examining how diet, genetics, and environment shape growth and lipid deposition. The doctorate, supported by a national fellowship, included three funded international research stays in France (2) and Italy: using zebrafish and trout models to study antioxidants, nutritional programming, and probiotic effects, respectively. The thesis received the highest distinction with a cum laude and an International Mention. After the PhD, the author joined NOFIMA, first through a Research Council of Norway postdoctoral grant and later as a permanent Research Scientist in the Nutrition and Feed Technology group. Postdoctoral work played an important role in refining omega-3 requirements for Atlantic salmon through a demanding large-scale, year-long sea-cage trial. This study clarified how higher dietary EPA and DHA influence physiology and performance under environmental stress, contributed to updated industry recommendations, received significant citations within a short period, and was shortlisted for a major journal award. The research trajectory integrates mechanistic biology with applied feed and nutrition solutions aimed at sustainability and product quality. Over more than a decade, the author has participated in 31 projects at institutional, national, European, and industry levels across multiple research groups and countries. Leadership roles include principal investigator positions, work-package coordination, management of interdisciplinary teams, and collaboration with partners in over 20 nations. The scientific output includes 45 publications, with a strong presence as first or senior author, nearly 800 citations, and an h-index of 18. Additional contributions include technical reports, conference papers, and 52 scientific communications. The author has also contributed to organizing major international conferences, highlighting recognized standing in the research community. Teaching and mentorship are consistent elements throughout the career, including supervision of undergraduate, master's, and PhD students, and over 60 hours of university lectures. Editorial positions and peer-review activity span multiple journals. An MBA and a master's degree in marketing reinforce their ability to bridge scientific innovation with industrial application, reflecting a profile that combines academic excellence, technical skill, leadership, and strong orientation toward practical impact in aquaculture.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
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Correo Electrónico: mtorresbejar@gmail.com
Título: Advancing Sustainable Agriculture Through Deep Characterization Of The Mechanisms Involved In Plant Colonization By Beneficial Bacteria

Resumen de la Memoria:

--Scientific trajectory--

My primary goal is to understand and harness beneficial microorganisms to enhance plant health and growth in agriculture. I have contributed to this field through 21 publications (13 as first author; >750 citations since 2020) in high-impact journals such as Nature Microbiology, Trends in Microbiology, New Phytologist, PNAS, mBio, mSystems, and Scientific Reports.

In recent years, I have established myself as an independent researcher and leader, securing 5 grants as principal investigator (>527K €) and collaborating on other competitively funded projects, including two EU-funded COST actions. My work has been recognized with the Vicente Callao and Modesto Laza Palacios awards. Additionally, I am actively involved in public science communication, teaching, and mentoring students.

My career has been shaped by extensive mobility, spanning my PhD and three postdoctoral positions in France, the USA, and Switzerland. This mobility has allowed me to build a broad network of national and international collaborators, broaden my perspectives, and achieve significant advancements in my research.

--Looking to the future--

Using beneficial microorganisms as inoculants in agriculture holds great promise for increasing crop yields, but challenges such as field efficacy and reproducibility of lab-selected strains have hindered widespread implementation of this approach. This has limited the ability of the scientific community and stakeholders to fully leverage plant-microorganism interactions.

Implementing the use of beneficial microorganisms in agriculture requires a thorough understanding of the underlying processes. However, traditional gene function discovery methods are time-consuming, creating a bottleneck in translating research into agricultural practices and predicting climate change impacts on plant-microbe interactions.

In my previous work I have used innovative high-throughput, time and cost-efficient methods to unravel gene function at large scales. For instance, I generated data across >400 lab conditions (e.g. plant and soil types) for 6,000 genes in four different beneficial bacterial species, which represents the largest dataset of plant colonization genes published to date. I could show the extent to which environmental factors like soil type can influence the bacterial pathways that can be targeted in for sustainable agriculture and therefore the performance of biostimulants.

Building on this foundation, I propose to move beyond lab conditions and use high-throughput gene function identification to unravel bacterial fitness genes involved in crop colonization under field conditions (e.g. drought, salinity, mixed bacterial communities, etc), not only at the individual strain level but at the microbiome level, by developing in situ tools. I plan to harness the knowledge generated to identify novel biostimulant strategies and ensure that they remain performant in the context of climate change. Fulfillment of these objectives will represent a leap forward regarding the basic understanding of how to improve crop productivity by facilitating the implementation of scientifically well-supported strategies.

Resumen del Currículum Vitae:

Moved by an interest to find sustainable alternatives to the widespread use of chemicals in conventional agriculture, I did my PhD at the UGR (Granada, Spain, 2013, FPU, 140K €). My doctoral work led to the characterization of bacteria with applications in aquaculture and agriculture. During my PhD I did 3 stays, in INRAE, CNRS and Univ. Montpellier (France). In recognition of my research, I received the Vicente Callao and the Laza Palacios awards. Further driven by the ambition to translate scientific advances into societal applications, I co-founded the start-up Xtrem Biotech, which commercialized beneficial bacteria to be applied in crops. Pursuing my interest in developing alternatives for the agriculture sector, in 2017 I obtained a Ramon Areces fellowship (53K €) to join the CNRS (Paris, France) as a postdoctoral researcher. There, I led a project to disentangle the mechanisms that allow bacteria to thrive in different plant organs.

Implementing the use of beneficial microorganisms as bioinoculants requires a good understanding of the underlying processes. To address this, in 2020 I joined the LBNL/Univ. California (Berkeley, USA) as a researcher in a large project (10M \$). I led a workpackage related to the use of a highly innovative and powerful approach combining high throughput genomics and metabolomics to find the pathways needed in a beneficial bacterium to colonize plants. Based on this approach, I could show that soil type strongly influences the identification of genes that can be targeted for sustainable agriculture and therefore the performance of biostimulants. During this period, I further initiated my work on reduced complexity microbial communities (SynComs), an alternative to single bacterial inoculums. Results to date include showing how different management practices affect soil microbiome.

A crucial aspect to the use of bacteria in agriculture is the understanding of their pathogenic potential and ability to colonize other living organisms. In 2021 I was awarded a MSCA Individual Fellowship (191K €) from the EU to join the UZH (Zurich, Switzerland) and led a project aimed at unravelling unique and shared pathways in beneficial and pathogenic bacteria for survival in plants and insects.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Temperature can modulate biostimulant action, hence a major challenge in the context of global warming is to ensure that they will remain performant in the future. In 2023 I obtained funding as a PI from both the Swiss Plant-Science-Center (187K €) and the Syngenta/Novartis Foundations (86K €) to disentangle how plant beneficial bacteria are affected by high temperature. Early project outputs show that the performance of biostimulants is strongly affected by temperature increase in the field. Related to this topic, since late 2024 I collaborate in a Project funded by the Ministry of Science and Innovation (Agriculture and forestry, PID2023-150154OB-I00, 118K €) to assess the potential of salt-tolerant bacterial strains to protect tomato plants. One other useful feature in beneficial plant bacteria is N₂ fixation. I am also part of a Swiss National Science Foundation (SNSF) Project (750K €) on elucidating the potential of N₂-fixing bacteria strains as biocontrol agents. In relation to the above, I am a member of two EU-funded COST Actions (ROOT-BENEFIT and TOP-AGRI-Network).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: ESCOBAR LANZUELA, NEUS
Referencia: RYC2025-056528-I
Correo Electrónico: neueslan@gmail.com
Título: Análisis de los impactos de la producción y consumo de alimentos y de tecnologías de base biológica
Resumen de la Memoria:

He desarrollado una carrera investigadora interdisciplinar, basada principalmente en la Ingeniería Agrónoma y Ambiental, la Ciencia y Tecnología de los Alimentos y la Economía Agraria. Mi investigación se centra en la cuantificación de impactos ambientales y socioeconómicos de la producción y consumo de alimentos y de productos de base biológica (biocombustibles, bioplásticos, bioquímicos), especialmente de los impactos mediados por el comercio internacional y de los derivados de los cambios de uso del suelo. Para ello, combino diversas metodologías cuantitativas de distinto alcance, mayoritariamente Análisis de Ciclo de Vida (a nivel de producto), modelos de optimización (a nivel de sector o cadena de valor) y modelos económicos globales, tanto de equilibrio parcial como general (a nivel de sector o de toda la economía, respectivamente). Además, basándome en metodologías del ciclo de vida, desarrollo indicadores para la evaluación de impactos ambientales asociados a la producción agrícola y forestal, como por ejemplo, la deforestación y la pérdida de biodiversidad; o de impactos derivados del consumo de alimentos, como por ejemplo, en la salud humana o el bienestar animal. Más recientemente, mi investigación se enfoca hacia el uso bases de datos espaciales, como por ejemplo, de contenido de carbono en los ecosistemas terrestres o de los rendimientos de los cultivos, para desarrollar Análisis de Ciclo de Vida espacialmente explícitos, con el objetivo de calcular huellas ambientales de productos biológicos con alta resolución. Para ello, mi trabajo también incorpora metodologías input-output para medir impactos que se propagan a través de las cadenas mundiales de suministro de productos alimentarios, agrícolas y ganaderos, considerando las relaciones de comercio internacional. El objetivo último de todos estos avances metodológicos es el de evaluar la sostenibilidad, efectos indirectos, y compensaciones de diversas políticas e iniciativas, tanto desde el punto de vista de la producción como del consumo, para contribuir a un sistema agroalimentario más resiliente y bajo en emisiones de carbono. Mi trabajo hasta la fecha proporciona evidencia de los riesgos e implicaciones de diversas políticas en el ámbito europeo e internacional, como la Directiva Europea de Energías Renovables, la Estrategia Europea en Bioeconomía, la Estrategia de la Granja a la Mesa, o el Plan de Compensación y reducción de Carbono para la Aviación Internacional. Estoy interesada en seguir una carrera académica a largo plazo centrada en la combinación de herramientas cuantitativas para evaluar el impacto de las decisiones y tecnologías en los sistemas agroalimentarios, con un enfoque del ciclo de vida prospectivo que también capture los efectos indirectos a través de mercados internacionales. Los modelos desarrollados reflejarán cambios en materias primas, eficiencia tecnológica, circularidad, costes de producción, patrones alimentarios, hábitos de consumo, políticas de innovación y nuevas normativas a lo largo de las cadenas de suministro. Los resultados de mi investigación tienen como objetivo apoyar la toma de decisión de políticos, agricultores, industria y consumidores en la transición hacia sistemas alimentarios sostenibles, alineados con estrategias nacionales y europeas como el Pacto Verde Europeo y de la Granja a la Mesa.

Resumen del Currículum Vitae:

El doctorado incluyó estancias de investigación en el extranjero, en la Universidad de Atenas (Grecia) y la Universidad de Purdue (Indiana, EE.UU.), durante 7 meses en total, obteniendo la mención de Doctorado Internacional. Después de trabajar unos meses en el Dpto. Tecnología de Alimentos de la UPV, para terminar proyectos y publicaciones relacionadas con la tesis y otros proyectos, empecé una estancia postdoctoral en la Universidad de Bonn (Bonn, Alemania), con una doble afiliación en el Instituto de Economía Alimentaria y de los Recursos y en el Centro de Investigación para el Desarrollo. Allí desempeñé un papel destacado y proactivo en el proyecto "Comercio sostenible y transferencia de innovación en la bioeconomía", financiado por el Ministerio alemán de Cooperación e Investigación, orientado a analizar los posibles riesgos de la bioeconomía. Esta experiencia dio lugar a importantes publicaciones como autora principal y otras tantas como coautora, las cuales han tenido repercusión a nivel político. Después de casi cuatro años, acepté un puesto de investigador en el prestigioso Instituto Internacional de Análisis de Sistemas Aplicados (IIASA), cerca de Viena (Austria). Allí trabajé en varios proyectos relacionados con las políticas y la producción de biocombustibles para la aviación. Fui nombrada observadora de la UE en las negociaciones del Comité sobre Protección del Medio Ambiente y la Aviación (CAEP) para el Sistema de Compensación y Reducción de Emisiones de Carbono en la Aviación Internacional (CORSIA). Con ello he contribuido a perfeccionar las metodologías de cálculo y seguimiento de las emisiones por cambios de uso de suelo de las principales materias primas y regiones productoras. En 2022, empecé mi proyecto Marie Skłodowska-Curie (MSCA) en BC3 (Bilbao, España) como investigadora principal, enfocado al desarrollo de una base de datos que representa las cadenas de suministro de 640 productos agroalimentarios en 181 países, desde la producción hasta la demanda final. En concreto, el proyecto MSCA desarrollaba módulos medioambientales para calcular huellas el uso del suelo y ambientales asociadas al consumo mundial de alimentos. Conllevó una comisión de servicio de 6 meses en la División de Ganadería de la Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO). Desde el fin de mi MSCA, soy Investigadora Senior en BC3, liderando como investigadora principal dos proyectos Horizonte Europa en temas de mitigación del cambio del cambio climático y de huellas de biodiversidad, además de seguir colaborando con la FAO como especialista en comercio agroalimentario. Actualmente superviso a un estudiante de doctorado, un postdoc y una tesis de máster, y colaboro con otras líneas de investigación en BC3 en proyectos de mitigación y adaptación al cambio climático.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: SANTAS MIGUEL, VANESA
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Título: Assessment of multiple environmental contaminants on soil microbial communities and resistance genes under global warming scenarios.

Resumen de la Memoria:

I hold degrees in Biology and Environmental Sciences, two Master's degrees, and a PhD in 2022 (UVigo) focused on tetracycline effects on soil microbial communities. My thesis received the Extraordinary Doctorate Award (2023) and the Best PhD Thesis Award from the Water Campus (2024). I have published 53 research outputs (63% Q1; 39% D1), with 50% in significant authorship positions, 822 citations and an h-index of 18. My work spans soil microbiology, ecotoxicology, antibiotic and metal toxicity, microbial tolerance, nanoparticles and sustainable agriculture.

My trajectory is shaped by international mobility and participation in European research networks. I completed 31 months of research stays, including a competitive 24-month postdoctoral fellowship at Lund University (SE), and additional stays in Portugal and Spain that expanded my expertise in ecotoxicology and soil-water interactions.

My independence is supported by competitive funding and leadership roles. I am the beneficiary of the Xunta de Galicia Postdoctoral Fellowship "Completar etapa de formación" (30k euros), which supports the consolidation of my independent research line. I have participated in major European consortia (Horizon 2020, Horizon Europe, Interreg), and as PI I lead the INOU+ POSDOU CAMPUS AUGA-2025 project (10k euros) and the Interreg Soil&WineResidues project (PI-UVigo) (87k euros). I am also Project Manager of the Erasmus+ project STOP FOREST FIRE FOR 5GREEN.

I have co-supervised one PhD thesis (2025), I am co-supervising another (expected 2027). I have supervised or co-supervised 12 Bachelor's and Master's theses. My teaching activity includes 329 hours at UVigo and Lund University across Bachelor's and Master's programmes, including coordination of the Bachelor's course "Soil Degradation and Recovery". My editorial work includes serving on the Editorial Boards of the International Journal of Environmental Research and Public Health (2022-2023) and the Spanish Journal of Soil Science (2022-present), and acting as guest editor of Special Issues in Q1 journals (Agriculture, Materials).

Research line:

My research focuses on understanding how mixtures of emerging and conventional contaminants-particularly antibiotics, pesticides and heavy metals-affect soil microbial activity, community composition, tolerance and co-tolerance mechanisms, and the dissemination of antibiotic resistance genes (ARGs). Under climate-warming scenarios, these pressures may intensify, modifying microbial functioning, resistance selection and soil multifunctionality. My proposal integrates long-term incubations, microbial functional assays and resistome analyses to (1) assess microbial responses to contaminant mixtures under warming, (2) identify functional and genetic mechanisms of tolerance and co-tolerance, (3) evaluate ARG dynamics, and (4) determine impacts on nutrient cycling, enzyme activities and microbial turnover times. This research addresses critical knowledge gaps at the intersection of soil ecology, global change and emerging contaminants, contributing to EU Soil Mission and Green Deal objectives.

Resumen del Currículum Vitae:

I hold degrees in Biology (USC, 2011) and Environmental Sciences (UVigo, 2016), as well as Master's degrees in Environment and Natural Resources (USC, 2012) and Agrifood and Environmental Science and Technology (UVigo, 2017). I obtained my PhD in 2022 (UVigo), focused on the impact of tetracyclines on microbial communities in agricultural soils, receiving the Extraordinary PhD Award (2023) and the Best Thesis Award of the Water Campus (2024). I have published 48 research papers (62% Q1; 50% in leading authorship positions), 46 original articles and 2 reviews, with 822 citations and h-index 18. In addition, I have authored 5 book chapters and presented >25 communications at national and international conferences.

My research career began in 2015 with studies on PAHs in soils, followed by a Master's thesis on soil amendment with by-products. I obtained the UVigo Predoctoral Fellowship (2019-2020) and the Xunta de Galicia (XG) Predoctoral Fellowship (2020-2022). During my PhD, I completed a 4-month stay at the University of Porto (PT) performing ecotoxicity assays. After my PhD, I carried out a 3-month postdoctoral stay at the Polytechnic University of Cartagena (ES) on soil microbial responses to fertilizers. I subsequently obtained a competitive XG Postdoctoral Fellowship to conduct a 24-month stay at Lund University (SE) under the supervision of Prof. Johannes Rousk, where I investigated microbial tolerance and co-tolerance to heavy metals and antibiotics, as well as mitigation strategies using soil amendments. I currently hold the XG Postdoctoral Fellowship "Completar etapa de formación," which supports the consolidation of my independent research line (30k euros).

As PI, I lead the "Soil&WineResidues" Interreg-SUDOE project (87k euros UVigo share) and the INOU+ POSDOU CAMPUS AUGA-2025 project (10k euros) on biochar production from vineyard and acacia residues. I am Project Manager of the Erasmus+ project STOP FOREST FIRE FOR 5GREEN and participate in GreenDT (Capacity Building). I have contributed as a researcher to 9 European and national projects, including SoildiverAgro (Task Leader for "Develop best agricultural practices"), Coppereplace, InBestSoil, BIOServiceS, AGROSUS, MRV4SOC, VITI-VALMO and STORCITO, as well as the development cooperation project ReSuElBen.

I co-supervised a PhD thesis defended in December 2025 and currently co-supervise a second PhD (defence expected 2027). I have supervised and co-supervised 12 theses (3 Master's, 9 Bachelor's) at UVigo and Lund University. My teaching experience includes 259 hours at UVigo and 70 hours at Lund University in Bachelor's and Master's degrees in Biology, Environmental Sciences, Agricultural Engineering, and Agrifood and Environmental Science and Technology.

In editorial activity, I served on the Editorial Board of the International Journal of Environmental Research and Public Health (2022-2023) and currently serve on the Editorial Board of the Spanish Journal of Soil Science (2023-present). I have been guest editor for special issues in Materials and Agriculture



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

(Q1). I have also been part of the organizing and scientific committees of the "Soils and Sustainable Development Congress" (PT) and the "1st Transnational Congress of the Auga Campus of Research Youth" (ES).



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: GOMEZ MORACHO, TAMARA
Referencia: RYC2025-055888-I
Correo Electrónico: tamaragomezmoracho@gmail.com
Título: Host-parasite interactions

Resumen de la Memoria:

Mi línea de investigación se centra en el estudio de las relaciones parásito-hospedador en el contexto del despoblamiento de colmenas y pérdida de polinizadores. En mi tesis doctoral estudié la genética de poblaciones de microsporidios parásitos de *Apis mellifera*, *Nosema ceranae* y *Nosema apis*, demostrando una dispersión reciente de *N. ceranae* en este hospedador que se consolidó en cinco trabajos científicos, tres como primera autora (Gómez-Moracho et al. 2014; Gómez-Moracho et al. 2015, Gómez-Moracho et al. 2015). He aportado conocimientos a la epidemiología de *N. ceranae* en tanto a patología apícola. En colaboraciones internacionales con Francia y Holanda demostramos la ausencia de variantes genéticas de *N. ceranae* con diferente virulencia (Dussaubat et al. 2013, Van der Zee et al. 2014). Asimismo, mis trabajos permitieron determinar a *N. ceranae* y *Lotmaria passim* como los patógenos más prevalentes en las colonias de abejas y responsables del despoblamiento de colonias en España (Cepero et al. 2014), así como el efecto patógeno de *L. passim* en abejas en condiciones de laboratorio en colaboración con la Universidad Complutense (Gómez-Moracho et al. 2020) lo que generó una nueva línea de investigación. En 2016 me incorporé como PostDoc a la Universidad de Toulouse donde participé en múltiples proyectos de ecología apícola y colaboraciones que dieron lugar a un total de 12 publicaciones científicas. En Toulouse lideré mi propia línea de investigación centrada en el estudio del efecto de los parásitos en el comportamiento y cognición en abejas, como el impacto negativo de *N. ceranae* en la capacidad de aprendizaje en abejorros (Gómez-Moracho et al. 2017, 2021, 2022). Mis estudios en nutrición animal proporcionaron información relevante acerca de cómo estos insectos regulan la colecta de nutrientes en presencia o ausencia de cría en la colonia (Kraus et al. 2019), así como los efectos negativos de la deficiencia del triptófano y su compensación con vitamina B3 (Tissier et al. 2023). También contribuí a la conceptualización y redacción del proyecto Eva Crane, del que figuré como investigadora, para estudiar los efectos de *Lotmaria* en la cognición de *A. mellifera*. En 2022, me incorporé a la Universidad de Granada, donde investigo los mecanismos de virulencia de *L. passim* usando herramientas de ingeniería genética (CRISPR-Cas9) en combinación con estudios in vivo. Mi investigación se centra en conocer los mecanismos patógenos de los tripanosomátidos de abejas, así como las rutas de transmisión (Tiritelli et al. 2025) y los factores que puedan influir en la colonización de la abeja y su estilo de vida (Carreira de Paula, et al. 2024). Asimismo, he contribuido a la generación de herramientas para el diagnóstico de tripanosomátidos (Barranco-Gómez, et al. 2022) y conocimiento de su genoma de *L. passim* (Ruiz Rodriguez, et al. 2024).

Resumen del Currículum Vitae:

En mi carrera investigadora exploro la interacción parásito-hospedador integrando la genética, la biología molecular, la ecología y el comportamiento en polinizadores, con estrecha relación con el despoblamiento de las colmenas. En 2010 me incorporé al Centro de Investigación Apícola y Agroambiental (CIAPA) de Marchamalo con una beca pre-doctoral INIA. Allí estudié la genética de poblaciones de microsporidios parásitos de la abeja melífera *Apis mellifera* (*Nosema ceranae* y *Nosema apis*), la relación entre la diferente virulencia de estos parásitos y sus variantes genéticas así como aspectos de su ciclo de vida como una posible reproducción sexual, que concluyó con cinco trabajos científicos. Participé en estudios de prevalencia que relacionaron el despoblamiento de las colmenas de nuestro país con la presencia de *N. ceranae* y *Crithidia mellificae*. En 2016, colaboré con la Universidad Complutense de Madrid, donde optimicé el crecimiento in vitro de los tripanosomátidos *Lotmaria passim* y *Crithidia mellificae*, y comprobé su efecto patógeno en abejas en condiciones de laboratorio. En 2016, obtuve una beca postdoctoral con la Fundación Fyssen (Francia) para trabajar en la universidad de Toulouse. Allí lideré mi propia línea de investigación para explorar el efecto de los parásitos en la cognición de abejas. Durante estos años como postdoc adquirí conocimiento y experiencia en ecología y comportamiento animal. Llevé a cabo estudios de nutrición que describen la capacidad de los abejorros de regular su balance nutricional en presencia o ausencia de cría, o que muestran los efectos negativos del déficit del aminoácido triptófano en la dieta de estos insectos. He participado en estudios de comportamiento animal explorando los desplazamientos de abejas con un radar armónico para elaborar modelos de redes. Estos años me brindaron 14 trabajos científicos, 4 como primera autora y uno como última. En 2021, contribuí a la conceptualización y redacción de un proyecto de colaboración internacional financiado por la entidad EVA-CRANE. En marzo de 2022 me incorporé al departamento de Parasitología de la Universidad de Granada con un contrato María Zambrano para desarrollar una línea celular CRISPR-Cas9 de *L. passim*. En 2023 fui beneficiaria de un contrato Marie Skłodowska-Curie-PF en la Universidad de Granada, con el que analizo los mecanismos de virulencia de *L. passim* en abejas en colaboración con el CIAPA. En 2022 fui beneficiaria como IP de un proyecto de investigación del plan regional de Castilla-La Mancha co-financiado con fondos FEDER. A lo largo de estos años he adquirido un amplio rango de capacidades científicas, he desarrollado herramientas de diagnóstico para detección y cuantificación de parásitos (PCR y qPCR) y participado en proyectos de I+D para poner a punto el funcionamiento de colmenas conectadas con sensores para analizar automáticamente la dinámica de las poblaciones de abejas ante factores de estrés ambiental. Durante mi carrera he publicado 33 artículos científicos, cinco capítulos en libros, y dos artículos de divulgación científica. He participado en congresos nacionales (4) e internacionales (11), y co-supervisado estudiantes de master (11) y doctorado (1). También cuento con actividad docente en Universidades en España (330h) y Francia (12h).



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: BALFAGÓN SANMARTÍN, DAMIÁN
Referencia: RYC2025-056934-I
Correo Electrónico: balfagon@uji.es
Título: Deciphering plant responses to combined stress

Resumen de la Memoria:

My research career is built around understanding how plants acclimate to combined abiotic stresses, with a strong focus on Mediterranean citrus under climate-change scenarios and on *Arabidopsis thaliana* under combined high light and heat (HL+HS). I have authored 21 publications, 20 of them on stress combinations; I am first author on 13 and corresponding author on 1, largely in Q1/D1 Plant Science and Horticulture journals. My work has been pioneering in citrus by characterising, for the first time at a systems level, how contrasting genotypes respond to drought + heat and to triple combinations of drought, high irradiance and heat, integrating physiology, metabolomics, proteomics and transcriptomics. These studies have identified key traits and pathways (photosystem II repair, UPR and translation control, proline- and GABA-related metabolism) that underpin tolerance and are now used as a conceptual and methodological reference by other groups. A recent corresponding-author D1 review on combined abiotic stresses in Mediterranean citrus orchards and an invited plenary lecture in China recognise my emerging leadership in this field.

In parallel, I have developed a complementary *Arabidopsis* line on HL+HS acclimation, reinforced by long-term collaborations with Prof. Mittler (Missouri) and Prof. Halliday (Edinburgh). I conceived and led the experiments that showed jasmonic acid is required for HL+HS acclimation and provided one of the first global transcriptomic descriptions of this stress combination, followed by a study identifying GABA as a central metabolic hub. During my Margarita Salas postdoc in Edinburgh I initiated an independent project demonstrating that WRKY48 negatively regulates HL+HS acclimation, and I am now extending this work through a new collaboration with UENF (Brazil), including a mechanistic preprint on HY5 currently under review in a high-impact journal. All omics datasets are deposited in public repositories, reflecting a consistent open science practice.

My career is strongly shaped by international mobility and collaboration. I have completed research stays at the University of Missouri (6 months), the University of Edinburgh (2 years, Margarita Salas), and currently at MARE@Polytechnic of Leiria (6 months), acquiring advanced skills in molecular biology, omics, synthetic biology, and bioprocessing of marine biomass. I have built and sustained collaborations with groups in Portugal (UTAD, MARE), Brazil (UENF, UENF/UESC) and Spain (IBMCP-CSIC, UENF), co-authoring multi-omic citrus and grapevine studies and hosting and supervising visiting researchers in my lab. This network is entirely aligned with my expertise in stress combinations and gives my profile a clear international and interdisciplinary dimension.

Over the last years I have made a clear transition to independence and leadership. I am PI of a competitive UJI project on metabolic reconfiguration in citrus under combined stress and co-PI of a substantial technology-transfer project with Organic Citrus S.L.U. on climate-resilient organic citrus cultivation. I have launched a new, self-defined line on seaweed-based biostimulants from invasive macroalgae, combining ecological valorisation with detailed hormonal, metabolic and transcriptomic analysis of plant responses to combined stresses, and linked to joint funding applications with MARE. I supervise Final

Resumen del Currículum Vitae:

My scientific career focuses on plant acclimation to combined abiotic stresses, with emphasis on climate-change impacts on Mediterranean citrus. Of my 21 publications, 20 address stress combinations in citrus or *Arabidopsis thaliana*; I am first author in 13 and corresponding author in 1. Over the last years I have led or co-led multi-omic studies that uncovered how citrus adjusts its physiology, metabolism, proteome and transcriptome to drought, high light and heat, individually and in combination. These works were among the first to address multifactorial stress in citrus at a systems level and have opened new research lines for other groups and my own, providing evidence and conceptual frameworks for experimental design and breeding strategies. This research, largely published in D1 Plant Science and Horticulture journals, identifies key traits and regulatory mechanisms underpinning tolerance to complex stress scenarios and has clear relevance for citrus agriculture under increasing climate variability. In 2025 I published my first article as corresponding author, a D1 review on combined abiotic stresses in Mediterranean citrus orchards, which consolidates my position as an emerging reference in this field and led to an invited plenary lecture at an international citrus congress in China.

In parallel, my citrus work has been complemented by research on *Arabidopsis* acclimation to high light and heat stress combinations. Through international collaborations and research stays, I have contributed to pioneering studies that, for the first time in a model plant, described the transcriptomic and metabolic reprogramming required for acclimation to simultaneous high light and heat. These projects, carried out in the groups of Prof. Ron Mittler (University of Missouri, USA) and Prof. Karen Halliday (University of Edinburgh, UK), resulted in publications in D1 journals such as *Plant Physiology* and *The Plant Journal* and positioned me within an active international network working on complex abiotic stress. My postdoctoral stay in Edinburgh was funded through a national Margarita Salas fellowship awarded in a competitive call, strengthening both my international profile and my ability to independently drive new research questions within established groups.

In recent years I have progressively developed my own independent research line. I coordinate a competitive project funded by Universitat Jaume I to dissect metabolic reconfiguration as a strategy to enhance citrus tolerance to multifactorial stress, and I co-lead a technology-transfer project with a citrus company that implements our findings in commercial orchards. I have independently established collaborations with two research groups in Portugal and one in Brazil. With Portuguese partners I have co-authored two publications on grapevine and citrus responses to combined stresses, am undertaking a six-month research stay at the MARE centre to investigate seaweed-derived biostimulants, and have submitted joint funding proposals. With Brazilian colleagues I have co-authored multi-omic citrus studies and am preparing a new manuscript. These collaborations, initiated and developed by me, reflect my capacity to build and coordinate international research networks around my core expertise.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

Beyond publications, I am committed to knowledge transfer, open science and training. My results have been p



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: LORENZO CORTES, CHRISTIAN DAMIAN
Referencia: RYC2025-054275-I
Correo Electrónico: chlorenzo1@gmail.com
Título: From the genome to the field and beyond: Advanced breeding solutions for a more sustainable agriculture
Resumen de la Memoria:

Bridging gene-level understanding of plant physiology with agricultural needs has been the driving force of my career. Working across Argentina, the United States, and Belgium, I have repeatedly taken on this challenge. Today, empowered by advanced genetic and biotechnological tools, the path from fundamental discovery to farmer-ready solutions is more tangible than ever. As climate pressures intensify and global food demand rises, developing resilient and resource-efficient varieties is no longer optional.

I am a molecular plant biologist specialized in plant development and translational biotechnology for crop improvement. I earned my PhD in 2017 at Fundación Instituto Leloir (Argentina), studying photomorphogenesis and flowering-time control in alfalfa, the country's most widely grown forage crop. In collaboration with Bioceres/INDEAR, I demonstrated that modulating FLOWERING LOCUS T (FT) genes delays flowering and enhances this forage's quality in controlled and field conditions. Delayed flowering extends the harvest window for high-quality forage, improving resource use and yield for farmers. In a subsequent postdoctoral work at Leloir, using insights gained during a stay in Joanne Chory's lab at the Salk Institute (USA), I investigated photomorphogenic responses in alfalfa and soybean to mitigate shade avoidance, with potential to increase planting density and optimize land use.

Building on my academic/industry experience, I joined the VIB-UGent Center for Plant Systems Biology as a Senior Postdoctoral Researcher to lead the ERC Advanced project BREEDIT, aimed at using multiplex genome editing to improve complex traits such as drought tolerance in maize. I developed the BREEDIT pipeline, generating large edited populations targeting key growth-repressor families and establishing efficient genotyping and phenotyping workflows. Within three years, we demonstrated that combining edits in growth repressors increased biomass and yield under drought by ~10-15%. The work was published in *The Plant Cell* (2023) and led to follow-up papers, including advances using CRISPR multiplexing with doubled haploids for rapid fixation and split Cas9/gRNA systems achieving >85% editing efficiency. BREEDIT has driven industrial collaborations and patent applications, with elite edited lines now evaluated in field trials in Belgium.

Throughout my career I have demonstrated thoroughly leadership, independence and coordination capacity, managing multidisciplinary academic teams like BREEDIT, mentoring students, supervising technicians, and serving as liaison between my host center and companies such as Bioceres, Inari and KWS.

Moving forward, my research focuses on engineering growth robustness under climate stress, using CRISPR multiplexing coupled with machine learning-based genotype/phenotype prediction. I aim to establish a tomato-based platform targeting major growth and flowering regulators, generating novel traits with enhanced performance under drought.

Resumen del Currículum Vitae:

I am a molecular plant biologist with a strong record in translational plant biotechnology, genome editing, and advanced breeding. I completed my Master's in Biological Sciences in 2012 (Universidad de Buenos Aires, UBA), and afterwards gained industrial experience as a scientific advisor at the Argentinean company ETC International (2009-2012).

I later joined Fundación Instituto Leloir (Argentina) in 2012 for my PhD under a public-industrial fellowship between Dr. Pablo Cerdan's lab and the Argentinean company INDEAR-Bioceres, funded by AGENCIA and CONICET. Here, I engineered delayed-flowering alfalfa, improving forage quality and management. This thesis work generated four first-author publications in high-ranking journals, including *Plant Biotechnology Journal* (2020) and *The Plant Journal* (2019) (≈300 combined citations). I obtained my Ph.D. in 2017 with the highest qualification, consolidating my expertise in plant transformation, photomorphogenesis, and crop biotechnology. Thanks to this, I also obtained a prestigious Fulbright Fellowship (Salk Institute, USA) in Joanne Chory's lab to strengthen my knowledge in shade-avoidance signaling (2017).

Back in Argentina as a postdoc in Marcelo Yanovsky's lab (2017-2019), and in collaboration with Pablo Cerdan, I coordinated projects combining fundamental light signaling with applied trait engineering in alfalfa and soybean, designing research lines, securing funding, supervising MSc/PhD candidates, and overseeing the evaluation of engineered lines under field conditions.

In 2019, I applied my accumulated experience in translational plant science as a Senior Postdoctoral Fellow at the VIB-UGent Center for Plant Systems Biology, co-leading the ERC Advanced Grant BREEDIT alongside Prof. Dr. Dirk Inzé. I developed the BREEDIT multiplex genome-editing pipeline, generating large maize mutant. The main publication (*The Plant Cell*, 2023) rapidly reached >90 citations, and the pipeline led to three additional original research papers, two corresponding-author reviews, and multiple invited talks (including Gordon Research Conferences, New Phytologist workshops, and Plant Biology congresses). During my whole career I have supervised 4 Master thesis projects, co-supervised other 3 Bachelor thesis and trained several technicians and fellow postdocs working in BREEDIT, being in charge of the development and publishing of their research lines.

My research has resulted in 22 publications (11 research papers as first or second author, 2 as corresponding author, one editorial, and 10 commentaries), 4 patent applications, 7 contributions to research projects, and to the creation of a spin-off Rainbow Crops (2025), focused on AI-assisted breeding. I maintain an active editorial role as Assistant Editor at *The Plant Cell*, guest editor in *Frontiers Genome Editing*, and frequent reviewer for top-tier journals.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: NAZAR, FRANCO NICOLAS
Referencia: RYC2025-055502-I
Correo Electrónico: franconnazar@gmail.com
Título: Bridging Immunology, Technology, and Health: Microfluidic Innovations for One Health Diagnostics and Early-Decision Making

Resumen de la Memoria:

My extensive experience spans physiology to biology and chemistry, reflecting a multifaceted skill set poised to contribute significantly to research, teaching, and knowledge dissemination, leading to a transdisciplinary scientific career that proves that a researcher can lead an international research group when working in a collaborative perspective with colleagues from complementary and interdisciplinary areas. I am a researcher with a strong international profile in my career: more than 6.5 years between short and long-term stays in renowned institutions in Argentina, Spain and Sweden. With the added value of having proven talent as an entrepreneur, I know the fundamental aspects of scaling knowledge obtained through basic science, which is a key and necessary aspect of knowledge transfer. My path has led me to understand that there is a knowledge gap I can fill with my research line: Recent global changes, driven by factors like climate fluctuations and increased trade for developing societies, pose complex challenges for animals. The push for efficiency in farming may lead to disease outbreaks (emergence and re-emergence), welfare issues, and antimicrobial resistance in livestock. Addressing these challenges, the Partnership on Animal Welfare (PAHW) under the EU Green Deal indicates it urges to develop procedures, methodologies, and tools to actively support the monitoring of animal health and welfare. My research path demonstrates vast experience and a pioneering attitude linking physiology to welfare in poultry and other livestock species. My latest experience as a Senior Researcher in the Microfluidic Cluster UPV/EHU, University of the Basque Country, Spain, has given me theoretical foundations and practical tools to design, manufacture and use microfluidic devices. In this intersection lies the empty niche I will fill with my research line, differentiating from my previous trajectory, and pursuing the following General Objective: to develop a targeted approach for the easy, early, and cost-effective assessment of health, welfare and stress responses in livestock animals by focusing on biologically relevant mediators: nucleic acids and hormones. Considering these mediators, Point-of-Care and/or -Need devices integrating sensors and microfluidic technology will be developed. This will efficiently minimize reagent volumes, speeding up and automating sample preparation and analytical measurements. My research line relies on three main Interconnected Blocks (IB). IB-Animals: to accurately characterise animals' condition when they are sick, stressed and in poor welfare; IB-Biomarkers: to choose precise molecules as representatives of each condition (Target Biomarkers); and IB-Devices: to develop and optimise microfluidic-based Point-of-Care and -Need sensors and devices. IBs provide the research line with complete plasticity: according to the state of the art for each livestock animal model, a different block or set of blocks will be developed. To conclude, agricultural production, product quality, and profitability will be enhanced, allowing early decision-making, favouring sustainable agricultural practices, and ensuring compliance with Spanish and EU regulations.

Resumen del Currículum Vitae:

My research path in physiological interactions in challenged animals started as an ad-honorem intern in Prof. R Marin's research group. I graduated with honours in Biology (MSc) from the UNC, Argentina, working for the first time in an undeveloped research area, fostering team capacities while developing my own research line. Then, I pursued a PhD in Biology at UNC, connecting two separate Research Institutes (IIByT and CIBICI) and two research areas (mammalian immunoendocrinology and avian behaviour), creating a new research area: avian immunoendocrinology. Competitive PhD fellowships from CONICET allowed me to collaborate with experts at Nat. Uni. of Río IV (Argentina) and use mycotoxins as environmental challenges. An international fellowship (2012) broadened my horizons, enabling productive collaborations in Spain with recognised groups at Neiker, VISAVET, and ISCIII. I secured the best postdoctoral fellowship from the Argentinian Government, paving the way for international collaborations in immunology, animal welfare, behaviour, and monoclonal/ELISA technologies, expanding my expertise in physiological responses to diverse challenges. This trajectory warranted a permanent position at CONICET (Independent Researcher), where I led the avian immunoendocrinology research line. A second postdoc at Neiker (Spain) under Prof. I. Estevez further strengthened my background in animal health and welfare. Currently, as a Senior Researcher at UPV/EHU, I focus on developing early stress-detection paper-based microfluidic devices for point-of-care use, contributing to frontier methodologies in stress assessment and enabling early warning systems for producers. My previous experience in industry and entrepreneurship strengthened my innovation-oriented profile, leading to a Spanish patent application during my time at UPV/EHU. My multidisciplinary and transdisciplinary research portfolio includes 6 grants as PI and 19 as team member, often responsible for the physiology of stress and immunology WPs. My commitment to mentoring includes supervising 8 research interns, 6 MSc projects and 4 PhD theses, including a co-supervision invitation from Prof. Keeling (SLU) to integrate physiology into her research team. I have served as a reviewer for 13 indexed journals and evaluated 8 MSc dissertations. I have been an invited speaker at universities and institutes in Sweden, Switzerland, Norway, and Spain, cultivating an international network of collaborators. I am an EFSA external expert on Animal Health and Welfare and an invited member of the COST Action LIFT (Lifting Farm Animal Lives), contributing to EU-level discussions on positive animal welfare and health. Passionate about knowledge dissemination, I dedicated 14 years to teaching at the National University of Córdoba, obtaining a tenure-track Assistant Professor position (2015). I have actively participated in public-facing events and engaged in industry and end-user collaborations on more than 13 occasions. My trajectory has given me a deep understanding of the EU and Spanish Research & Innovation landscape in sustainable agriculture, health, and welfare. I have explored microfluidic technologies and their high potential, defining a clear roadmap for my career at the intersection of physiology, animal health, welfare, and microfluidics, aligned with sustainable agriculture and ONE HEALTH.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias

Nombre: GONZÁLEZ DOMÍNGUEZ, RAÚL

Referencia: RYC2025-054908-I

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Título: Metabolómica, Nutrición y Salud

Resumen de la Memoria:

Degree in Chemistry with honors in 2010 (9.44/10, [Premio Extraordinario Fin de Carrera](#)) and cum laude PhD in Chemistry in 2015 (International Mention, [Premio Extraordinario de Doctorado](#)) at University of Huelva (Spain). Along my scientific career, I have been recipient of 7 pre- and postdoctoral grants funded by some of the most competitive Spanish programs for training and recruiting excellence researchers, securing ca. 650k €. During my predoctoral stage, I obtained 4 grants for initiation in research ("Beca de Colaboración" - MEC) and for completing my PhD studies (FPI & FPU). Then, I moved to University of Barcelona under the "Juan de la Cierva" post-doctoral program (JdC-F, 2017-2019; JdC-I, 2020-2021). In 2022, I joined Instituto de Investigación e Innovación Biomédica de Cádiz (INIBICA) as a "Miguel Servet" researcher. Currently, I am the Principal Investigator of the "Metabolomics & Bioanalysis" group and Head of the "Metabolomics Research Unit" at INIBICA.

My research interests are focused on the development of state-of-the-art omics approaches (i.e., metabolomics & metallomics) and further application in biomedicine, nutrition, and food science. In particular, I have contributed to the development of bioanalytical key methods employed worldwide for characterizing the role of the gut microbiota, nutrition, and other sources of exposure (i.e., the exposome) in health status, and to unravel the influence of interindividual variability factors in the context of precision medicine. Using these methods in population-based cohorts, clinical trials, and animal models, I have great experience in investigating the molecular mechanisms and risk factors behind the onset and progression of a variety of cardiometabolic and neurological diseases.

Active participation in university theoretical/practical teaching from 2012 to date (>700 h, complying with incompatibility limitations established by R+D scholarships I obtained), 5 Teaching Innovation Projects, teaching training (>200 h), and divulgation activities.

Resumen del Currículum Vitae:

Scientific Activity. Despite my young career age, I am an author of 108 JCR articles (30 D1, 71 Q1), 13 book chapters, and editor of 3 books. Active participation in scientific conferences (86/67 contributions in International/National conferences). Researcher in 19 International Projects (JPI-HDHL, EIT-Health, COST) and 29 National Projects (MCIN, ISCIII) funded through competitive calls, and in 7 R+D contracts with public and private entities. Recognized among the most influential researchers according to the [World's Top 2% Scientists](#) ranking (Stanford University) since 2020. Quality Indicators: h-index: 36; Total cites: 4056 (Scopus).

Transfer / Valorization Activity. Author of one Utility Model (Oficina Española de Patentes y Marcas), co-developer of two open-access software tools (FOBI, POMA), and coauthor of a business plan in the framework of an EIT project (NOFIB). In the context of the Responsible Research and Innovation (RRI) initiative, I have also transferred my research to the overall society by participating in outreach events ([European Researchers' Night](#), [Semana de la Ciencia](#)), in the form of interviews in communication media (Fundación Descubre), and scientific dissemination articles.

Mobility / International Activity. Researcher in 19 International Projects (PI in COST Action CA21139), co-PI of one R+D EU contract, and member of various cooperation networks (COST, MetaboRed, RICORS-SAMID). Furthermore, I have conducted 10 research stays at national and international prestigious centers for a total of 28 months (e.g., Chalmers University of Technology, Aberystwyth University, CEMBIO). Because of this collaborative experience, I have coauthored 42 publications with international colleagues.

Leadership. My leadership is reflected in the authorship of most of my scientific production as the first (55) or senior/corresponding (57) author, and the direction of 3 Doctoral Thesis (in progress), 19 [End-of-Master](#), 29 [End-of-Course](#), and 3 Erasmus+ projects. Furthermore, I have been the PI of 5 National Projects, 2 R+D contracts, and Management Committee Member of one COST Action (secured >600k €). In this sense, I have also demonstrated my ability to attract resources for hiring (pre/postdoctoral researchers) and for supporting my research activities (open access, mobility) (ca. 450k €). Because of this solid background, I have been invited to be a speaker in scientific conferences, member of 10 editorial boards (BMC Med, JPA, Antioxidants), reviewer/editor for JCR journals (>175/>50), and project evaluator for competitive funding entities. Moreover, I am recipient of multiple prizes/mentions: BBA Rising Star 2024, Metabolites Young Investigator 2024, Investigador Joven FEXP-UHU 2021, JAFC Article of the Year 2021, Joven Investigador GRASEQA 2016.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: VIVAS CONEJERO, MARIA
Referencia: RYC2025-056654-I
Correo Electrónico: mariavivasconejero@gmail.com
Título: The relevance of the microbiota as an early marker of tree and soil health to predict a sustainable management of the Dehesa system

Resumen de la Memoria:

My research goal is to increase the resistance of trees against diseases and pests and improve the sustainability of forestry and agroforestry systems in a changing environment. To address this objective, I have developed several lines of work and self-financed my research career through competitive calls. This funding has consisted of an FPU predoctoral contract, three competitive postdoctoral contracts abroad, a Juan de la Cierva Incorporation and a Proyecto Emergente.

During my PhD, I did two international internships at the University of California (Davis, USA) and another at the University of Aveiro (Portugal), to acquire new skills. These collaborations opened my scientific circle and awakened my need to collaborate with international research groups. After my PhD, I took a position as a post-doctoral fellow at the Forestry and Agricultural Biotechnology Institute in Pretoria (South Africa). This period was completely funded by competitive fellowships, which allowed me to manage my own funds and develop my research line as PI. This period allowed me to expand my network of contacts and collaborate with researchers from other institutions. These international collaborations remain ongoing. Afterwards, I returned to Spain with a Juan de la Cierva-Incorporación fellowship and obtained the I3 Research Certification. I have established myself as an independent researcher in the Forest Research Group of the University of Extremadura, where I focus on microbiome studies aimed at improving the resilience of ecosystems. Recently, I have been awarded a competitive grant (Proyectos Emergentes, Junta de Extremadura) to fund my project as Principal Investigator for the next 3 years.

My research line hypothesises that changes in the microbial communities of the system (soil, root and leaf) can mediate the responses to changes in land management and affect the health status of the tree and soil. The main aim is to combine the assessment of tree health status with soil status and interactions with microbiota to understand the impacts of ecological intensification and Dehesa abandonment. This knowledge will support the development of improved early indicators to explore the impact of emerging management practices across broad territorial scales. This line focuses on the Dehesa, the most widespread silvopastoral system in Europe, where land use trends of abandonment and intensification have been evident for decades. The effect of adaptive grazing and the sowing of legumes (sustainable management) will be compared with the traditional model of continuous grazing and the abandonment trends, in Dehesas with contrasting climatology, to predict future responses to a changing climate. Subsequently, this research line follows a multidisciplinary approach (microbiology, plant ecophysiology and soil health) with a particular focus on the interrelation between tree health, soil health and associated microorganisms as indicators of sustainability. This research represents a step forward in our current understanding of Mediterranean silvopastoral systems by investigating how different management interventions can improve their sustainability.

As a concluding remark, I publish the results of my research in outstanding peer-reviewed journals, review papers and research proposals, participate in outreach activities, present at congresses and supervise students.

Resumen del Currículum Vitae:

The main research line of my scientific career focuses on studying the mechanisms that keep trees healthy. My goal is to advance understanding of plant-microorganism interactions with genetic, maternal and environmental effects to build resilience and anticipate the performance of forest and agroforestry systems. I have developed this broad research line by focusing on multiple topics at different stages of my career.

I completed my PhD in the Forest Research Group of the University of Extremadura (FRG) and in the University Institute for Research in Sustainable Forest Management (INIA-University of Valladolid). My work studied the pathogen fungus *Fusarium circinatum*, which causes important damage and economic losses in nurseries and natural or planted stands of pines. I evaluated the genetic and environmental variability of pine susceptibility to the pathogen and tested the influence that environmental maternal effects have on these susceptibility patterns. These findings provided a deeper understanding of how to better manage this disease in *Pinus pinaster*. Concurrently, I joined three different international research groups, published six scientific papers in peer-reviewed journals, and lectured and supervised the projects of forestry students.

My postdoctoral period comprises five years at the Forestry and Agricultural Biotechnology Institute (Pretoria, South Africa), a well-known institute in Forest Pathology. This period was funded by competitive fellowships, which allowed me to manage my own funds as PI and develop my own research line. I was building on findings that the plant phenotype is not only determined by its genotype and the environment it grows in, but also the environment where the maternal plant grew in. My work considered the potential impact of the maternal environment on the fungal endophyte communities of the seedlings. I also developed a project that assessed mycorrhizal community assemblages in *Euphorbia ingens* trees in South Africa, to gain broader insight into biodiversity loss when trees die off in a landscape. During this period, I expanded my network of contacts, supervised international students and disseminated scientific advances in the sector.

Afterwards, I returned to Spain with a Juan de la Cierva-Incorporación fellowship to the FRG. In this position, I established myself as an independent researcher focusing on microbiome studies aimed at improving the resilience of the ecosystems and obtained the I3 Research Certification. Recently, I was awarded a competitive grant (Proyectos Emergentes, Junta Extremadura) to fund my project as Principal Investigator for the next 3 years. This position allows me to regularly supervise students and participate in the European Night of Researchers and local outreach activities in schools.

Overall, I have self-funded most of my career through competitive calls. I have also led two international and two national research projects as PI, published a book chapter and 34 SCI articles (2/3 Q1; 15 as first author), and developed a multidisciplinary research background through international collaborations. I have been invited as a keynote speaker in international courses and trained national and international students. Finally, I contribute to inter-/national congresses and review papers and project proposals in my field.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: MUSTIELES MIRALLES, VICENTE
Referencia: RYC2025-057214-I
Correo Electrónico: vmustielesmiralles@gmail.com
Título: Prediction and mitigation of the effects of human exposure to food-related chemicals

Resumen de la Memoria:

The trajectory of the candidate has been characterized by the identification of food-related synthetic chemicals, especially bisphenols and phthalates, that may act as risk factors for adverse developmental effects in population studies, including low birth weight, prematurity risk, childhood obesity, hormonal disruption and neurodevelopmental impairments. The main objective was the generation of knowledge and elucidation of potential mechanisms to know the implications of population exposure to these chemicals, as well as communicate these findings to regulatory agencies such as the European Food Safety Authority (EFSA) to facilitate the assessment of risks and the implementation of policies to protect the general population. Additionally, a recent research line of the candidate suggests that an optimal status of nutrients such as folate and vitamin D can protect from the adverse effects of environmental chemicals.

Resumen del Currículum Vitae:

Vicente Mustieles (VM) is a Sara Borrell postdoctoral researcher transitioning to a Miguel Servet Senior Position in January 2026, linked to the IIS GRANADA and San Cecilio University Hospital (HUSC). VM performed a 3-month predoctoral stay at the Harvard School of Public Health, obtaining the International PhD degree (2018) in the Clinical Medicine and Public Health program and the Extraordinary Doctorate Prize (2022) at University of Granada (UGR). His thesis showed that human early-life exposure to the endocrine disruptor and food contaminant bisphenol A (BPA) was associated with an increased risk of low birth weight and prematurity in newborns, as well as hormonal, metabolic and neurobehavioral alterations in children. These findings were considered by the EFSA, supporting the current ban of BPA in food contact materials.

His national postdoctoral work in the Human Biomonitoring for Europe (HBMEU) included the coordination of 21 European teams to identify and validate the most relevant biomarkers to predict the adverse effects of chemicals, highlighting his work on the neurological marker BDNF.

The candidate has conducted two international postdoctoral stays in the Institute for Advanced Biosciences (IAB) of Grenoble (France), where he applied novel biostatistical methods to data from the ERC-funded SEPAGES mother-child cohort, and got funding as co-PI of the ELEMENTUM project. The first stay was of 14 months (2021-2022), while the candidate just completed a second postdoctoral training of 9 months (March-December 2025) in the same French team. Overall, VM has a working experience outside of Spain of more than 2 years, and has been unlinked to his institution of origin (University of Granada) for the last 3 years.

VM is an emerging leader in the field of environmental epidemiology and food safety, with 108 JCR papers (90 international collaborative articles), 92% in the first quartile and 68% in first decile, being first, last or corresponding author in 25 of them (H-index: 34; 3073 citations; Scopus). VM has supervised 2 PhD theses, 8 TFGs and 15 TFGs. His current team includes a PhD student (PFIS predoctoral contract), a physician pursuing PhD, and a postdoctoral student from Harvard University. VM is principal investigator (PI) of the RADIOMIX national project (FIS PI23_01884, budget: 177k€), co-PI of an international French project (ELEMENTUM, budget: 250k€), and has participated as a collaborator in 2 international (HBM4EU and PARC) and 7 national projects. He is a current OECD advisor (2022-2026) - nominated by the Spanish Ministry - for the identification of neurotoxicity biomarkers and a member of the EDC working group of the European Society of Endocrinology.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: VÁZQUEZ FERNÁNDEZ, ROBERTO
Referencia: RYC2025-056951-I
Correo Electrónico: rvazqf@gmail.com
Título: Integrative molecular biology of phage-derived proteins for food applications

Resumen de la Memoria:

My research focuses on the integrative molecular biology of phage-derived proteins, particularly endolysins, with applications in the food industry. During my postdoctoral stage at Ghent University (2021–2025), I led the research line on lysins, supervising four PhD theses and six Master's theses, while securing independent funding from FWO, ESCMID, and MSCA. I have developed high-impact computational tools, such as SPAED for protein domain segmentation and SUBLYME for lysin discovery in metagenomes, integrated into the PhaLP 2.0 database, reinforcing my profile as an independent researcher and creator of open research infrastructure. As corresponding or first author on many publications, I have established paradigms in structural-functional analysis of cell wall-binding domains and the optimization of antimicrobial lysins. In parallel, I have transferred knowledge to industry through Obulytix BV, co-designing lysin discovery pipelines and co-supervising an industrial PhD.

My proposed research aims to develop a comprehensive approach combining "top-down" analysis of bacterial susceptibility in food environments with a "bottom-up" strategy of experimental evolution of lysins using synthetic phages. The objective is to identify bacterial determinants that modulate lysin activity, characterize evolutionary adaptations under controlled environmental pressures, and generate design principles for optimized antimicrobial agents. This line integrates experimental tools (an in virio phage editing and evolution platform) and computational approaches (naïve lysin design), consolidating an autonomous and sustainable research ecosystem.

My previous experience in protein domain characterization, in silico analysis, project supervision, and acquisition of international funding equips me to lead this line independently. The research will connect environmental microbiology, bioengineering, and food industry applications, providing a rational framework for lysin design and developing a phage technology hub in Spain, aligned with One Health principles and the circular economy. This proposal will enable a shift from empirical screening strategies to informed and contextualized design, enhancing Spain's scientific and technological competitiveness in phage-derived antimicrobials.

Resumen del Currículum Vitae:

After my BSc in Biotechnology and MSc in Environmental, Industrial and Food Biotechnology, I became strongly interested in how human activity intersects with microbial systems. This led me to join Pedro García's group at CIB-CSIC (Madrid), a leading lab in phage-based protein applications, where I pursued my PhD exploring the antimicrobial potential of phage lysins for biocontrol of human, animal and foodborne pathogens. During my PhD I identified a major challenge: lysin data were rapidly increasing, while interpretation and translation lagged. This shaped my research vision of combining experimental and computational approaches to generate actionable insight. I built a hybrid in silico/in vitro pipeline to mine phage genomes, engineer antimicrobial candidates and evaluate their performance. My thesis yielded eight first-author papers (two also as corresponding author), two co-authored papers, ten conference contributions, an International Doctor Mention and an Extraordinary PhD Award.

To expand my understanding of phage protein diversity, I joined the Laboratory of Applied Biotechnology at Ghent University (LAB-UGent), led by Prof. Yves Briere and known for high-throughput lysin engineering. After a competitive selection I obtained a doctor-assistant position and broadened my technical range, working with the VersaTile DNA assembly system and AI tools such as AlphaFold. I co-developed computational resources for lysin research—including SUBLYME and SPAED—and led their integration into PhaLP 2.0, the most comprehensive lysin database. Experimentally, I optimized medium-scale protein production and standardized lysin activity testing against pathogens relevant to health, food safety and industrial processes.

At LAB-UGent I demonstrated growing independence by securing individual funding (ESCMID Individual Research Grant 2024, MSCA Postdoctoral Fellowship, FWO Senior Postdoc Fellowship on temporary leave), mentoring MSc and PhD students (co-directing four theses) and coordinating the lab's lysin research line. My work resulted in eleven publications. I also contributed to conceptual and methodological harmonization through papers on lysin nomenclature and experimental standardization, and participated in technology-transfer activities by co-drafting the business plan for Obulytix, later providing consultancy and co-supervising an industrial PhD. I have been active in science communication (FAGOMA) and served on the scientific committee of the Belgian Society for Viruses of Microbes. In 2025 I co-organized The Phage Protein Meeting, the first international event dedicated to phage proteins.

I am now conducting my MSCA Postdoctoral Fellowship at IPLA-CSIC (DairySafe group). My two-year project aims to build a platform for phage and phage-protein engineering with a One Health perspective, strengthening applications in food production, food safety and animal and human health. Overall, my work highlights phage lysins and related components as an underexplored resource. My long-term goal is to establish myself as an independent researcher applying evolution-aware microbiology to improve the safe and effective use of microorganisms in processes essential to human wellbeing, food systems and environmental stewardship.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: VÁZQUEZ MORÍS, JOSE ANTONIO
Referencia: RYC2025-056028-I
Correo Electrónico: moris.josev@gmail.com
Título: Investigación en incendios forestales con énfasis en los incendios naturales

Resumen de la Memoria:

Estudié ingeniería técnica forestal e ingeniería de montes en España. Hice un master Erasmus Mundus en ciencias forestales en Finlandia y Alemania, y me doctoré en 2017 en ciencias forestales por la universidad de Turín, Italia. Durante mi doctorado hice una estancia en la Oregon State University (OSU) en Estados Unidos. Antes del doctorado trabajé en el Centro Común de Investigación (JRC) de la Comisión Europea.

He tenido varios contratos posdoctorales. El primero en el instituto federal suizo de investigación para los bosques, la nieve y el paisaje (WSL). El segundo en la universidad de Nápoles Federico II, y después en la universidad de Turín. Actualmente soy el investigador principal de un proyecto sobre incendios causados por rayos en la Universidad Libre de Ámsterdam, financiado por el programa europeo Marie Skłodowska-Curie Actions Postdoctoral Fellowships (MSCA PF).

He publicado 20 artículos en revistas científicas con revisión por pares (5 más están en la fase revisión), de los cuales 9 como primer autor y/o de correspondencia. También publiqué 4 datasets de acceso libre, 4 ponencias de congreso, así como 2 artículos en revistas para profesionales forestales. He participado en 16 presentaciones orales y 12 posters en conferencias científicas.

Asimismo he participado en numerosos proyectos científicos durante mi carrera, en muchos como colaborador investigador, si bien he sido investigador principal en dos proyectos internacionales sobre incendios forestales causados por rayos. También colaboro habitualmente con servicios meteorológicos públicos como MeteoSwiss y MeteoCat, unidades de investigación de incendios forestales, y con empresas privadas como Earth Networks y Meteorage.

He recibido 3 premios y una beca predoctoral, y fui el supervisor de 3 tesis de master y 2 estudiantes de doctorado. También impartí clases en cursos de estadística, teledetección y ecología. Soy revisor en varias revistas científicas. Tengo el certificado de profesor ayudante doctor en España y el de ecólogo en incendios forestales de la Asociación de Ecología del Fuego (AFE). También soy miembro de varias asociaciones científicas como la European Geosciences Union (EGU), y de grupos de trabajo internacional sobre los incendios forestales.

Resumen del Currículum Vitae:

Aunque estudié ingeniería forestal en España, he desarrollado toda mi trayectoria en investigación fuera de España. Antes del doctorado, trabajé durante un año (entre 2012 y 2013) en el Centro Común de Investigación (JRC) de la Comisión Europea, realizando modelización del carbono forestal.

En 2014 comencé mi doctorado en la Universidad de Turín (Italia) donde estudié la resiliencia de los bosques de alerce al cambio global. Pasé 7 meses en la Universidad Estatal de Oregón (OSU) como parte del doctorado. En noviembre de 2017 defendí mi tesis doctoral.

En 2019 fui investigador postdoctoral en el instituto federal suizo de investigación para los bosques, la nieve y el paisaje (WSL) durante 10 meses, donde estudié los incendios causados por rayo en los Alpes suizos.

En 2020 fui investigador postdoctoral durante un año en la universidad de Nápoles Federico II (Italia) y participé en el proyecto europeo PREVAIL sobre incendios forestales.

Entre 2021 y 2024 fui investigador postdoctoral en la Universidad de Turín (Italia), donde formé parte de varios proyectos, la mayoría sobre incendios forestales. En 2022 y 2023 fui además el investigador principal de un proyecto sobre incendios causados por rayos financiado por el gobierno de Asturias, en el cual colaboré con diversos investigadores internacionales.

Desde septiembre de 2024 soy el investigador principal de un proyecto financiado por el programa europeo Marie Skłodowska-Curie Actions Postdoctoral Fellowships (MSCA PF) en la Universidad libre de Ámsterdam, Holanda. El proyecto FIREISKY - Lightning-ignited wildfires: thunderstorms and extreme events tiene una duración de dos años y pretende caracterizar las tormentas que producen incendios forestales y las condiciones que conducen a que algunos incendios naturales se conviertan en eventos extremos.

Antes del doctorado, mis trabajos fin de carrera y tesis se centraron en la conservación del urogallo y los efectos de la gestión forestal en su hábitat. Desde el doctorado mi carrera como investigador se ha centrado principalmente en los incendios forestales. En particular de:

1. Ecología del fuego. He trabajado en aspectos diversos de la ecología forestal, con énfasis en los caracteres de las plantas y las especies arbóreas que les confieren resistencia y resiliencia a los incendios forestales. Por ejemplo, mi tesis doctoral giró en torno a la ecología del fuego de los bosques de alerce en diferentes regiones del mundo.

2. Gestión de incendios forestales en un contexto de cambio global. Me he ocupado de varios aspectos, entre ellos el efecto del abandono rural y el cambio de los usos del suelo sobre los incendios forestales.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

3. Los incendios causados por rayos. En la actualidad estoy centrado en esta línea de investigación en la existen grandes lagunas de conocimientos debido a las dificultades para estudiar la ignición derivada de los rayos. Mi intención es seguir con este tema y consolidar mi reputación y colaboración internacional e interdisciplinar.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: FERNÁNDEZ BOO, SERGIO
Referencia: RYC2025-055332-I
Correo Electrónico: fernandezboo.sergio@gmail.com
Título: Improvement of shellfish production by searching for traits of interest to counteract climate change scenario

Resumen de la Memoria:

Since the conclusion of my PhD at CIMA (Centro de Investigación Mariñas, SP) focused on the host-pathogen interaction between clams and parasites, and after a one-year stay at Ifremer in France, I became a formal researcher at CIIMAR (Interdisciplinary Centre of Marine and Environmental Sciences of the University of Porto) and currently, I am co-PI of the Aquatic Animal health group. I am leading a research line on the group focused on host-pathogen interactions in bivalves, impact of climate change on bivalve production and genetic selection of traits of interest, such as resistance to diseases and higher tolerance to high temperatures or salinity drops.

Right now, I have a small group of persons working in 4 different projects from Postdocs, PhD students, MSc, BSc students to technicians.

At this moment, I have 44 peer-reviewed publications, being the first author in 10 of them and last author in 4. Even working in such a small area as mollusc pathology and mollusc production, I believe that my research had a big impact being cited 690 times by 591 documents and a h-index of 16 (Scopus). My research is in a positive trend being 2023 the year with more publications (7) and 2025 the year with the highest number of citations (139).

Nowadays, I am co-leading a Twinning Project, from European Research Executive Agency (REA) program, called GRINNAQUA funded with €1,45M from which CIIMAR was awarded with 839k€. I am WP leader of a Next Generation Portuguese project with 263k€ for my line of research and also, I am WP leader of the European Partnership program (ShellfishBoost) funded by European Union with 147k€ for my line of research from a total of €1.4M of the whole project.

During last years, I built a network which allow me to enter in several European consortiums and to co-supervised students between institutions.

I believe that during last years, I have acquired skills in team management allowing me to support the research of my students and to continue applying to new grants. Additionally, I use to collaborate in activities of dissemination of science to public and in programs for the attraction of talented students to the field of marine research such as the Blue Young Talent program in which I am part of the directive board.

Finally, I maintain a strong collaboration with industrial partners performing a close collaboration with them in scientific projects, but also by doing tasks under a subcontracting modality.

Resumen del Currículum Vitae:

Bivalve aquaculture is a fundamental activity for coastal regions and specially for some communities such as happens in Galicia. This activity generates a direct income of 116M€ per year and employs around 4000 persons directly, most of them women (74% in 2022 according to Instituto Galego de Estatística). This activity relies mainly in natural seed availability and with little supply of seed coming from some hatcheries but only for *Ruditapes philippinarum* and *Venerupis corrugata* species. As this activity is done in an open system with any control on the environmental conditions, some extreme events such as heatwaves, salinity drops by large periods of rainfall and contamination could lead to massive mortalities impacting directly the communities involved in the sector.

During last years, some extreme events provoked massive mortalities, without going further, in winter 2023, a massive mortality event impacted the Ría de Muros e Noia with the loss of income of around 1500 fisherman who live directly from this activity. For this reason, it is necessary to advance in the area of genomics to grow more resilient strains of bivalves and also to prevent massive mortalities by knowing the factors that led to mortalities.

In this sense, my area of research will be focused in four major pillars:

 Search of the genetic signature for climate change impact minimization: this will be the main line of my research, to do so, in vivo experiments with the main species of the sector simulating heatwaves or major salinity drops will be done. The genetic signature of the resistant individuals will be analysed to select biomarkers of tolerance to implement breeding programs in hatcheries.

 Effect of the microbiota community in mortality: it is well-known that mortality events is a multicause effect. The increase of temperature or decrease of salinity could be not enough to reach mortality in bivalves. But, the modification of the microbiota in host led to an increase of pathogenic bacteria that, in combination with the stressful event provokes mortality. One more major outcome of this research is to evaluate if the microbiota community of resistant individuals to a disease is different to the susceptible ones.

 Pathobiome analysis: the combination of the physico-chemical properties of the water together with the pathogen incidence and microbial community correspond to the "Pathobiome" term. The objective of this line is to use the water parameters data already available at INTECMAR website in Galicia, the pathogen load of bivalves and the microbial community to search for the event that trigger these mortalities.

 Immune priming: Successive expositions to high temperature in short periods of time can lead to an adaptation to heatwaves. It could important to know if the main bivalve species had those characteristics, and if it is feasible to do that before to put it the bivalve seed into the estuaries which usually led to a high mortality losing a high percentage of the seed.

All the lines here exposed are thinking to contribute in a more cost-efficient culture to avoid high economic losses which implies strong socio-economic impact in local communities. I believe that my research can make significant contributions in the area and specially in the Spanish aquaculture sector which faces a crucial moment with loss of productivity and employment.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: CATALÁN BAHAMONDES, JAIME DELMIRO
Referencia: RYC2025-055935-I
Correo Electrónico: dr.jcatalan@gmail.com
Título: Sperm Physiology and Reproductive Technologies: Innovative Approaches in Animal Reproduction

Resumen de la Memoria:

Research career. My scientific career has developed across national and international institutions and focuses on reproductive physiology of domestic animals, particularly equids. I completed my PhD at the Autonomous University of Barcelona (UAB), funded by the competitive Becas Chile programme. During my PhD, I carried out research stays at the University of Teramo (Italy) and the Austral University of Chile. After defending my thesis (Excellent Cum Laude, International Mention, Extraordinary PhD Award), I obtained a competitive postdoctoral contract at the Department of Excellence of UNITE (Italy), followed by two prestigious national fellowships: Margarita Salas and Juan de la Cierva, the latter being my current position at the University of Girona. I also completed an additional six-month postdoctoral stay at UNITE, strengthening my expertise in sperm physiology. My trajectory has been fully funded through competitive contracts and has generated a solid scientific output, including 52 SCI papers (43 Q1) and translational advances in collaboration with biotech companies.

Main research line. My work is structured around six complementary axes within reproductive biology of domestic species: (1) molecular mechanisms and functional effects of sperm photostimulation, providing pioneering evidence of red-light action; (2) identification of seminal plasma antioxidants associated with cryotolerance; (3) development of an in vitro model of the post-insemination uterine environment to study sperm-female tract interactions; (4) metabolomic profiling of seminal plasma and follicular fluid to identify metabolic routes influencing sperm function; (5) demonstration of the regulatory role of follicular fluid in sperm capacitation; and (6) description of extracellular vesicles in donkey and horse seminal plasma and their relevance for sperm cryopreservation. Together, these axes integrate molecular, functional and translational approaches aimed at improving fertility in mammals.

Internationalisation and leadership. My experience across academic and private sectors, together with sustained international mobility, has enabled a strong collaborative network in Europe and the Americas, reflected in numerous internationally co-authored publications. I serve on the Editorial Boards of three Q1 journals, work as Associate Editor for one journal and Guest Editor for five special issues, and act as reviewer for more than 20 SCI journals. I hold full teaching accreditation (ANECA, AQU Catalunya), have delivered more than 400 hours of university teaching, supervised 14 BSc and 3 MSc theses, and currently co-supervise 4 PhD students. I have been PI or co-PI of five competitive projects and several industry contracts, securing approximately €300,000.

Future perspectives. My goal is to consolidate a research line focused on the molecular determinants of sperm function—including sperm capacitation, seminal plasma components, extracellular vesicles, interactions with the female reproductive tract and improvements in cryopreservation—and their impact on fertility. This knowledge will support the development of new tools for preserving and optimising sperm function, enhancing capacitation outcomes for use in equine IVF, and establishing an independent and competitive research programme within the public scientific system.

Resumen del Currículum Vitae:

I graduated in Veterinary Medicine from the Austral University of Chile in 2015 (first in my class), obtaining as a prize a 2-month research stay in the United States. I received two highly competitive national fellowships—Becas Chile MSc Abroad (2016) and PhD Abroad (2017)—to pursue a Master's degree in Animal Health and Production at the Complutense University of Madrid (GPA 8.9/10) and a PhD at the Autonomous University of Barcelona (UAB). My thesis (Effects of Photostimulation on Donkey and Horse Semen; Excellent Cum Laude, International Mention) generated five Q1 articles as first author and received the Extraordinary PhD Award from the UAB and the Award for Best Doctoral Thesis in Veterinary Sciences from the Academy of Veterinary Sciences of Catalonia. I completed predoctoral research stays at the University of Teramo (Italy, 4 months) and at UACH (Chile, 3 months). After my PhD (2021), I obtained a competitive postdoctoral contract from the Department of Excellence (UNITE, Italy; 18 months). Later, I secured two competitive national fellowships: Margarita Salas (2023–2024), carried out between the UAB and the University of Girona (UdG), and Juan de la Cierva (2024 to present; ~15% success rate), which I currently hold at the UdG and which included a 6-month stay at UNITE. Altogether, I have accumulated more than 31 months of international research experience.

My research focuses on equine reproductive physiology, including sperm photostimulation, seminal plasma biomarkers, in vitro modelling of the post-insemination uterus, and sperm biology. I have published 52 papers in SCI/JCR journals (43 Q1), with 33 in relevant authorship positions (17 as first author, 5 as last/senior author, and 11 as second author), in addition to 5 book chapters, 42 SCI abstracts, and 52 conference contributions (16 oral). My scientific impact includes 782 citations, an h-index of 16 (Scopus), and 197 citations in 2024. I have participated in 10 competitive research projects (5 as PI), obtaining approximately €300,000, in addition to 5 industry-funded R&D contracts.

My main contributions include: (i) the pioneering molecular characterization of red-light photobiostimulation in sperm; (ii) the identification of seminal plasma antioxidants associated with cryotolerance; (iii) the development of an in vitro model of the post-insemination uterine environment; (iv) the metabolomic profiling of seminal plasma and follicular fluid; (v) the demonstration of the regulation of sperm capacitation by follicular fluid; and (vi) the first description of extracellular vesicles in donkey seminal plasma. I also contributed to the production of the world's first donkey embryo through OPU-ICSI.

I have taught more than 400 hours of university courses in Veterinary Medicine (UAB, UNITE), Biology and Biotechnology (UdG). I have supervised 14 Bachelor's theses, 3 Master's theses, and I am currently co-supervising 4 PhD theses, demonstrating strong training capacity and research leadership. I am a member of the editorial board of three Q1 journals, serve as Associate Editor for one of them, and have been Guest Editor in five special issues. I review for more than 20 SCI journals, have been invited to give lectures in Europe and the Americas, and actively participate in scientific outreach.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: FERNANDEZ NINO, MIGUEL ANGEL
Referencia: RYC2025-056240-I
Correo Electrónico: mafernandezn@gmail.com
Título: Engineering microbial consortia for sustainable food biotechnology

Resumen de la Memoria:

I am a food scientist and synthetic biologist with a PhD in Biochemical Engineering (Germany, 2017). Since then, my career has evolved into that of an independent PI leading an internationally connected research programme on microbial consortia, metabolomics and sustainable bioprocesses. I have authored 35 peer-reviewed publications in top Q1 journals, including 15 as corresponding and 10 as first author, evidencing scientific leadership and continuity. My recent conceptual work From Circuits to Symphonies (first and corresponding author, peer-reviewed at Nature Communications with minor revisions resubmitted), proposes a new paradigm for multimicrobial engineering and underpins both my ERC Consolidator proposal (MICROSYNTPHONY) and the CSIC I-LINK consortium I coordinate.

As PI, I have secured over EUR 285,000 in competitive public funding from Germany, Spain and Colombia, plus a USD 60,000 industry contract with Casa Luker S.A. These projects enabled me to establish: (i) a multi-omics platform for cocoa fermentation applied in industrial settings; (ii) controlled fermentation and starter-culture technologies transferred to producer communities; and (iii) new institutional research lines at IATA-CSIC on microbial communication (SYNCBIOME), food-residue valorisation (SUSTENTABLES) and engineered biofactories (VALOLIVE), fully aligned with IATA's Severo Ochoa priorities. I have supervised 4 PhDs (1 completed, 3 ongoing), 3 Master's and 6 Bachelor's theses, and trained FP Dual students, demonstrating sustained capacity-building and leadership.

My independent trajectory is reinforced by commissions of trust: Expert Evaluator for MSCA-Horizon Europe, co-investigator in the GVA-EMERGENTES NeuroBac project, contributor to the Horizon Europe proposal FLOWSAFE (CL6-FARM2FORK, under evaluation), editorial responsibilities with Elsevier and extensive invited teaching in Spain, Colombia, Mexico and Costa Rica. Beyond academia, I lead the Biotechnology Working Group of the Colombian-German BioGeCo network and serve as Director of Science and Technology at Siembras de Origen, strengthening links between research, industry and policy.

The research line I will develop as a Ramón y Cajal fellow (Engineering synthetic microbial consortia and microbial biofactories to transform food residues into sustainable high-value bioactive ingredients) builds coherently on this trajectory while opening a distinctive frontier at IATA-CSIC. The programme integrates multi-platform metabolomics, bioprospecting, microbial communication engineering, metabolic rewiring and the programmable design of synthetic consortia. It addresses major European priorities on circular bioeconomy, zero waste and sustainable food production. The RyC period will consolidate the conceptual, collaborative and technological foundations necessary for a competitive ERC resubmission and position IATA-CSIC as a European leader in engineered multimicrobial systems for food biotechnology.

Resumen del Currículum Vitae:

I am a food scientist and synthetic biologist with a PhD in Biochemical Engineering from Germany (2017). My research centres on two integrated lines: (i) engineering synthetic microbial consortia and biofactories to valorise food residues into sustainable bioactive ingredients; and (ii) rational design of safe and sustainable food processes using multi-omics and starter-culture engineering. These lines directly align with IATA-CSIC's Severo Ochoa priorities on sustainable food processes, waste valorisation and biofactories for ingredients.

I have authored 35 peer-reviewed publications in top Q1 journals (including Scientific Reports, Food Chemistry, Food Frontiers, Journal of Cheminformatics and Food Research International) with 15 papers as corresponding author, 10 as first author and 6 as second author, evidencing sustained scientific leadership. My recent conceptual preprint From Circuits to Symphonies (first and corresponding author, peer-reviewed at Nature Communications with minor revisions resubmitted), proposes a new paradigm for multimicrobial engineering and received >200 downloads within 48 hours, signalling its visibility and impact. This work underpins my ERC Consolidator proposal (MICROSYNTPHONY) and the CSIC I-LINK consortium that I coordinate.

Since my PhD, my trajectory has evolved as an independent PI. I have led eight competitive projects in Germany, Colombia and Spain, securing over EUR 285,000 in public funding (Alexander von Humboldt Foundation, MINCIENCIAS, CSIC-ICOOP, IMPULSA-IATA, CSIC-COCREA, Bayer Foundation) and a USD 60,000 industry contract (Casa Luker S.A.). These projects enabled me to establish: (i) the first cocoa-focused multi-omics platform in Colombia and Germany; (ii) controlled fermentation systems and starter cultures transferred to industrial farms; and (iii) new institutional lines at IATA-CSIC on microbial communication, engineered consortia and waste valorisation (projects SYNCBIOME, SUSTENTABLES, VALOLIVE).

I have supervised 4 PhDs (1 completed, 3 ongoing), 3 Master's theses, 6 Bachelor's theses and 2 FP Dual students, demonstrating a strong and formal commitment to researcher training. I have designed and taught more than 10 specialised courses and schools in Spain, Colombia, Costa Rica and Mexico on microbial biofactories, metabolomics and food biotechnology.

My professional activities reflect broad scientific independence: Expert Evaluator for the Marie Skłodowska-Curie Actions; co-investigator in the GVA-EMERGENTES NeuroBac project; contributor to the Horizon Europe proposal FLOWSAFE (CL6-2024-FARM2FORK, under evaluation); editorial roles with Elsevier; and reviewer for international journals. I maintain strong international collaborations with partners in Germany, Spain, the UK, Australia and Latin America.

Beyond academia, I serve as Director of Science and Technology at Siembras de Origen, a science-based startup connecting Latin American producers of sustainable ingredients with European buyers through traceability, regulatory compliance and applied R&D. I also lead the Biotechnology Working Group of the Colombian-German BioGeCo network, advancing science diplomacy initiatives now being extended to Spain via Humboldt-supported actions.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: BARGUÉS TOBELLA, AIDA
Referencia: RYC2025-054864-I
Correo Electrónico: aida.bargues@agrotecnio.udl.cat
Título: Managing the Soil-Plant-Water Nexus in Drylands: Evidence for Restoration and Agroforestry
Resumen de la Memoria:

I am a soil scientist and ecohydrologist focusing on the restoration and sustainable management of tropical dryland ecosystems, particularly agroecosystems. My research examines the soil-plant-water nexus, especially how changes in tree cover, land use, and management practices affect soil health and water availability in drylands.

My research trajectory combines process-based field studies with landscape-scale monitoring and synthesis to generate decision-relevant evidence for restoration and sustainable land management. A first core contribution has been to demonstrate when and why trees can enhance soil hydrological functioning in drylands. Through field-based ecohydrological research, I have shown that tree influence can increase infiltration and promote deep drainage and potential groundwater recharge, particularly under high-intensity rainfall, and I have advanced process understanding of preferential flow and soil structure that control infiltrability. A second contribution is scaling evidence beyond single sites by developing and analyzing harmonized datasets of field infiltration measurements linked to soil and land health indicators across broad environmental gradients. This work has quantified key determinants of infiltration capacity, highlighting that it depends not only on soil texture, but also on soil structure, and has helped address geographic biases in global databases of soil hydraulic properties. A third contribution is translating scientific evidence into practice through engagement with international organizations and implementation partners, helping ensure that ecohydrological insights inform restoration planning, implementation, and monitoring and evaluation.

During the Ramon y Cajal period, I will consolidate and extend this trajectory through an integrated research program structured around three interrelated research lines: (1) Soil ecohydrology: managing the soil-plant-water nexus for improved water security in drylands, (2) Tree-based restoration and agroforestry in drylands, (3) Social-ecological linkages among land health, restoration, and human wellbeing. Feasibility is ensured because these research lines are anchored in active projects with established field infrastructure, ongoing doctoral research, and existing partnerships (e.g., Restore4More, Afrogrow, Include2Restore). While these research lines are currently implemented mainly through projects in sub-Saharan Africa, I am developing new strategic collaborations to extend the program to Mediterranean drylands.

Resumen del Currículum Vitae:

I am a researcher at Agrotecnio  CERCA Centre and an affiliated researcher at the Department of Forest Ecology and Management (Swedish University of Agricultural Sciences, SLU, Sweden). At Agrotecnio, I co-founded (2025) and co-lead the  Soil and Water Improvement with Management  (SWIM) research group. I was appointed  Docent  (Associate Professor equivalent) in Soil Science at SLU in December 2024.

Since my PhD in Soil Science at SLU, I have developed an internationally recognized independent research line on dryland and agroforestry ecohydrology. I began my path toward scientific independence with a Mobility Starting Grant from the Swedish Research Council for Sustainable Development (Formas) that allowed my stationing at the World Agroforestry (ICRAF) headquarters in Nairobi, Kenya, from April 2018 to March 2020. Over the past eight years, I have participated in various research projects funded by national and international agencies, holding leadership roles as principal investigator or work package leader in six of them. I have secured and managed ~1.6 M[€] as the main applicant and principal investigator, and ~6 M[€] as the institutional principal investigator (HORIZON project), demonstrating research leadership, financial autonomy, and team coordination.

I have co-authored 23 SCIE peer-reviewed articles in high-quality international journals and 12 additional outputs (including technical reports, book chapters, and policy briefs) bridging science and policy. My publications have received 1378 (WoS) / 2655 (Google Scholar) citations, reflecting the international visibility and impact of my work. Altmetric/PlumX indicators further show uptake beyond academia, including citations in policy documents and broad readership (e.g., Mendeley) for several key papers.

I have a strong interdisciplinary focus and work with an extensive global network of scientists and intergovernmental and non-governmental organizations. I actively engage with stakeholders to translate research into practice through collaborations with FAO, IGAD, SIWI/Swedish Water House, and NGOs such as WeForest and Vi Agroforestry, including contributions to tools, technical guides and reports, capacity development activities, and advisory support.

I have supervised two PhD theses to completion (L. Lulandala, 2022; V. Mukampariwa, 2024), and currently supervise four PhD candidates, in addition to mentoring MSc students. At SLU, I have contributed to teaching across all higher-education levels and led the master's course  Sustainable Forestry and Land Use Management in the Tropics  (15 ECTS). Between 2021 and 2022, I served as Director of Studies for the master's Program  Forest Ecology and Sustainable Management .

I contribute to academic community service as Associate Editor for CABI Agriculture and Bioscience (2022–2025) and Agroforestry Systems (February 2025–present), and as external examiner/evaluation committee member for doctoral dissertations. My broader leadership roles have included coordinating the SLU Future One Health platform in Umeå (2022–2024) and serving as SLU representative in international initiatives (CA4SH,



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

2021-2024; ARUA-Guild CoRE, 2024). I was selected as a SIGHT Fellow (Swedish Institute for Global Health Transformation, Royal Swedish Academy of Sciences; 2021-2023). In 2024, I received the SLU Silver Medal for Distinguished Service.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: GUTIERREZ LOPEZ, RAFAEL
Referencia: RYC2025-056567-I
Correo Electrónico: rafgutlop@gmail.com
Título: Transmission dynamics of zoonotic diseases mediated by insect vectors

Resumen de la Memoria:

I am a multidisciplinary researcher specializing in the ecology of vector-borne and zoonotic diseases, with a particular focus on mosquito-borne pathogens. My work applies a One Health framework to understand how ecological and anthropogenic factors shape pathogen transmission among wildlife, livestock, and humans. I integrate field ecology, molecular biology, entomology, virology, and epidemiology to investigate the mechanisms driving disease emergence in a rapidly changing world.

My scientific trajectory is structured around three complementary research lines:

1. Pathogen surveillance and discovery, using molecular and metagenomic tools to detect and characterize emerging zoonoses.
2. Vector competence and transmission dynamics, assessing how insect vectors acquire, maintain, and transmit pathogens.
3. Eco-evolutionary interactions in pathogen-vector-host systems, examining how global change restructures these networks.

I obtained my Ph.D. (Cum Laude, Extraordinary Doctorate Award) on mosquito-pathogen interactions and the determinants of transmission potential. My postdoctoral path in Spain, the UK, and Portugal consolidated my international profile. At The Pirbright Institute (UK), I contributed to research on genetically modified mosquitoes designed to block arbovirus transmission. At CIBIO-InBIO (Portugal), I led studies on the effects of deforestation on vector distribution, behaviour, feeding preferences, and implications for disease ecology. In Spain, through fellowships at UIB and INIA-CSIC, I investigated the veterinary relevance of neglected vectors such as *Culicoides*, *Phlebotomus*, and *Culex*, with a strong emphasis on West Nile virus (WNV) transmission in birds and mammals. I am currently a Sara Borrell fellow at ISCIII and a researcher at CIBERINFEC, where I evaluate the public-health risks of zoonoses through integrated epidemiological, experimental, and molecular approaches.

My research spans multiple scales, from molecular and experimental studies to ecosystem-level analyses, bridging wildlife conservation, veterinary health, and human epidemiology. I have led field campaigns in Europe and Africa, developed experimental models in BSL3 facilities, and coordinated diverse international collaborations. I also edited the book *Ecology of Diseases Transmitted by Mosquitoes to Wildlife* (Wageningen Academic Publishers, 2022), bringing together contributions from 43 authors across 14 countries to synthesize current knowledge from a One Health perspective.

Beyond my research outputs, I actively participate in international networks, including two COST Actions (AIM-COST and WIMANET). I have presented my work at more than 20 international conferences and published 38 scientific articles, 19 as first or corresponding author, in collaboration with 138 researchers from 20 countries.

Throughout my career, I have demonstrated independence, leadership capacity, and the ability to build multidisciplinary and international partnerships. My expertise across zoonotic pathogens, insect vectors, vertebrate hosts, and environmental drivers provides a comprehensive understanding of the complexity of host-pathogen-vector systems. Overall, my trajectory reflects a strong commitment to advancing surveillance, understanding, and control of vector-borne diseases through innovative, collaborative, and impact-oriented research.

Resumen del Currículum Vitae:

I am an accomplished researcher with a multidisciplinary background in insect-borne zoonotic pathogens within a One Health framework, as demonstrated by the breadth and impact of my scientific contributions. I have authored 38 publications (34 JCR-indexed articles and 4 book chapters), with 19 as first or corresponding author and 6 as second author. Notably, 77% of my articles appear in Q1 journals such as *One Health*, *Current Opinion in Insect Science*, and *Emerging Infectious Diseases*. My work has received more than 715 citations (H-index: 16; i10 index: 21, Google Scholar), and I am the first author of my five most cited papers, underscoring my leading role in high-impact research. One publication (Gutiérrez-López et al., 2020, *Parasitology*) reached an Altmetric score of 92 (top 5% of all research outputs), was selected as "Paper of the Month," and received the Early Career Researcher Prize (500€) in 2021.

A major milestone in my career is editing the book *Ecology of Diseases Transmitted by Mosquitoes to Wildlife* (Gutiérrez-López et al., 2022), published by Wageningen Academic Publishers, which represents a significant contribution to the field of disease ecology. I have also served as guest editor for two special issues: "Pathogens of Wild Birds: Prevalence, Molecular and Morphological Characterization for Pathogens" in *Pathogens*, and "Global Movement and the Spread of Vector-Borne Diseases: Challenges and Strategies" in *Frontiers in Tropical Medicine*.

I have presented my work at more than 20 international and national conferences, including four invited talks. I have secured approximately 240,000€ in competitive postdoctoral funding (Margalida Comas, Juan de la Cierva, Sara Borrell) and ~90,000€ as Principal Investigator for two competitive projects, as well as 8,000€ in travel fellowships (Spanish Ministry of Science and AIM-COST Action). I have participated in 12 R&D&I projects funded by European, national, and institutional agencies, collaborating with over 20 institutions across Europe, Africa, and America. I currently co-lead the Communication and Dissemination Working Group of the WIMANET COST Action, further demonstrating my leadership in research coordination and outreach.

In academia, I have taught 55 hours of lectures in Zoology and Parasitology at the University of the Balearic Islands and, since 2024, I am a lecturer in the Master's Degree in Virology at the Complutense University of Madrid. I also contributed as a lecturer to the MOOC "Mosquitos, Enfermedades y



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Cambio Global,² hosted by the University of Granada, an innovative initiative to promote public understanding of vector-borne diseases in the context of global change.

I have supervised two Master's theses (Complutense University of Madrid; University of Alcalá de Henares) and three undergraduate theses (University of the Balearic Islands; University of Granada). Beyond academic work, I am strongly committed to science communication through activities such as the European Researchers' Night, popular science articles (e.g., Quercus, El Indiferente), and educational outreach programmes.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: ALCASENA URDÍROZ, FERMÍN JESÚS
Referencia: RYC2025-055944-I
Correo Electrónico: ferminalcasena@gmail.com
Título: Probabilistic Wildfire Risk and Strategic Treatment Planning in Spain

Resumen de la Memoria:

Soy investigador senior en la Universidad Pública de Navarra, integrado en el grupo THERRAE y el instituto IS FOOD, donde lidero el proyecto ANDIA de atracción de talento senior y co-dirijo el proyecto nacional FLARE. Mi trayectoria combina formación sólida en ciencias agrarias y forestales (tres másteres y un doctorado en Gestión Forestal y Ambiental por la UdL) con más de cuatro años y medio de experiencia internacional en Italia, Líbano y Estados Unidos. Durante mi etapa como investigador postdoctoral en el US Forest Service, bajo la supervisión de Alan Ager y en colaboración con Meg Krawchuk, contribuí al desarrollo del Fireshed Registry y a los análisis que sustentan la Wildfire Crisis Strategy estadounidense, aprendiendo a trabajar en proyectos que vinculan directamente la modelización avanzada con decisiones de planificación a gran escala.

Mi línea de investigación se centra en la modelización probabilística de incendios forestales y la evaluación cuantitativa del riesgo para comunidades, infraestructuras y valores ambientales, así como en el diseño de estrategias de gestión de combustibles a escala de paisaje. He desarrollado y aplicado marcos metodológicos que integran simulaciones estocásticas basadas en el algoritmo Minimum Travel Time con métricas de exposición y daño esperado, tanto en paisajes mediterráneos como a escala continental. Entre mis principales contribuciones destacan la primera evaluación nacional de probabilidad de quema y exposición en Portugal, la comparación de estrategias de tratamiento a escala de paisaje frente a la zona de defensa de viviendas, y el desarrollo de cartografía de interfaz urbano-forestal en Cataluña y a escala europea. Esta actividad se refleja en más de 40 publicaciones científicas y de datos, con una parte significativa como primer autor o autor de correspondencia, y en una participación intensa en proyectos europeos H2020 y LIFE.

La línea que propongo para la ayuda Ramón y Cajal persigue trasladar esta experiencia al contexto español mediante el desarrollo de un marco nacional de evaluación probabilística del riesgo y planificación de tratamientos estratégicos en áreas de alta prioridad. En sinergia con ANDIA y FLARE, se identificarán firesheds y comunidades con mayor probabilidad de sufrir incendios extremos, se integrarán modelos de ocurrencia, propagación y transmisión de riesgo, y se aplicarán técnicas de escenario planning con ForSys para diseñar carteras de tratamientos multifuncionales que protejan comunidades vulnerables, restauren paisajes culturales resilientes al fuego y faciliten las operaciones de extinción. Todo ello se articulará desde principios de ciencia abierta, con datos y códigos compartidos en repositorios de acceso libre y con herramientas visuales tipo panel interactivo dirigidas a servicios forestales, protección civil y cuerpos de bomberos.

Resumen del Currículum Vitae:

El Dr. Fermín J. Alcasena es investigador senior en la Universidad Pública de Navarra, integrado en el grupo THERRAE y el instituto IS FOOD, donde lidera el proyecto ANDIA de atracción de talento senior y codirige el proyecto nacional FLARE. Su formación combina la Ingeniería Agronómica por la UPNA (fue galardonado con el Premio Tomás Rubio 2011), un máster en Ingeniería de Montes y otro en Ciencia y Gestión Integral del Fuego por la Universitat de Lleida, y un doctorado en Gestión Forestal y Ambiental (2019, UdL).

Su actividad investigadora se centra en la modelización probabilística de incendios forestales, la evaluación cuantitativa del riesgo y el diseño de estrategias de tratamientos preventivos a escala de paisaje y de interfaz urbano-forestal. Ha contribuido de forma destacada al desarrollo del Fireshed Registry y la Wildfire Crisis Strategy en Estados Unidos y a marcos de gestión del riesgo en España, Portugal e Italia, trabajando estrechamente con servicios forestales y cuerpos de bomberos.

El Dr. Alcasena es autor de 38 artículos científicos revisados por pares, 2 data papers y 1 editorial, siendo primer autor o autor de correspondencia en alrededor de un tercio de ellos. Sus trabajos acumulan más de 1.250 citas y un índice h de 22 en Scopus y Web of Science. Ha coautorado informes técnicos de referencia como el booklet del proyecto FUME, la guía de gestión de CLIMARK y el informe RMRS GTR 425 del US Forest Service. Como revisor, ha realizado 43 evaluaciones para 20 revistas internacionales y ha sido evaluador de proyectos en convocatorias competitivas de la AEI (cinco proyectos) y de la FCT portuguesa (cuatro proyectos).

Su trayectoria internacional supera los cuatro años y medio e incluye un contrato como asistente de investigación en el CMCC IAFES de Sassari (Italia), una participación como experto internacional en el proyecto UNDP CEDRO en Líbano, una estancia predoctoral de seis meses en la College of Forestry de Oregon State University y más de 2 años como investigador postdoctoral con el US Forest Service a través del programa J1 International Visitor, así como una estancia STM en el CNR IBE de Sassari. Ha participado en proyectos europeos de gran envergadura como FIRELOGUE y FirEurisk, además de liderar u orientar acciones de transferencia hacia administraciones forestales.

Actualmente es investigador principal de ANDIA y coinvestigador principal de FLARE, con un presupuesto conjunto superior a 0,5 millones de euros, y ha contribuido a proyectos nacionales e internacionales con un volumen total de financiación superior a 45 millones. Ha firmado contratos OTRI de transferencia con el Gobierno de Navarra, cuyos resultados se han incorporado a los Planes Forestales y se difunden en repositorios de acceso abierto como Zenodo.

En el ámbito formativo, acumula más de 350 horas de docencia en grados y másteres oficiales en la UdL, la UPC y la UPNA, en materias de gestión forestal, restauración de paisajes, incendios y SIG. Actualmente tutela y dirige cuatro tesis doctorales y ha contribuido a la formación de jóvenes investigadores cuyos trabajos se han publicado como artículos de tesis doctorales y trabajos de máster. Su actividad docente y de mentoría se



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

desarrolla en entornos internacionales y multiculturales, con especial atención a la igualdad de oportunidades y a criterios de evaluación alineados con DORA.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: VELA CORCIA, DAVID
Referencia: RYC2025-056019-I
Correo Electrónico: dvela@uma.es
Título: Plant disease control for sustainable crop protection

Resumen de la Memoria:

The main focus of my scientific career has been the study of plant pathogenic microorganisms and their interaction with the host plant, from basic mechanisms of infection and defence evasion to the development of innovative strategies for their control. I first worked with the biotrophic fungus *Podosphaera xanthii*, causal agent of cucurbit powdery mildew, which provided me with a solid background in fungal plant pathology, including molecular characterisation of virulence factors and management of fungicide resistance in key horticultural crops. I obtained a PhD fellowship (FPI) from the Spanish Ministry of Science and Innovation (MICINN) to carry out my doctoral thesis at the University of Málaga.

After completing my PhD, I obtained a competitive postdoctoral contract at the Hebrew University of Jerusalem (HUJI, Israel), where I spent four years working mainly with *Botrytis cinerea*. During this period, I focused on understanding the mechanisms by which *B. cinerea* resists plant antimicrobial compounds, particularly glucosinolates and their derivatives, and on the characterisation of a biocontrol organism acting against this pathogen. This work led to several high-impact publications (including one as first author in *Nature Communications* and others in *PNAS* and *Molecular Plant Pathology*) and significantly advanced our understanding of plant-microbe interactions. I then moved to the University of Exeter (UK) with another competitive postdoctoral contract, where I conducted a nine-month stay dedicated to describing the mode of action of azole fungicides on *Zymoseptoria tritici*, the causal agent of wheat septoria, by combining microscopy and biochemical approaches.

Back in Spain, I first held an international contract co-funded by the University of Málaga and Koppert Biological Systems (The Netherlands), focused on bacterial biocontrol, particularly on the interaction between *Bacillus velezensis*/*B. subtilis* and phytopathogenic fungi and nematodes, and on the identification and characterisation of nematocidal and antifungal metabolites. Subsequently, I obtained a highly competitive PAIDI 2020 postdoctoral contract from the Andalusian regional government, which has been key to consolidating my scientific independence and leadership. Within this framework, I have developed my own research line on plant-microbe-pathogen interactions and acted for the first time as Principal Investigator of a project aimed at identifying new key factors underlying the biocontrol activity of *B. velezensis* UMAF6639.

My research trajectory has therefore focused on fundamental aspects of the plant pathogenic lifestyle of fungi and nematodes, as well as on practical applications for their control, including the development of molecular, genomic and cell-biological tools for functional analysis. To date, I have published 15 articles in JCR-indexed journals, including several as first, corresponding and/or senior author, and I have participated in multiple competitive research projects across Spain, Israel and the UK. I have co-supervised seven Master's theses and supervised five Bachelor's theses, and I am currently co-supervising a PhD thesis. I am part of the editorial board of *Frontiers* journals and have served as guest editor for a special issue in *Plants* (MDPI), in addition to acting as reviewer for numerous international journals and as evaluator for research

Resumen del Currículum Vitae:

I am a plant pathologist with 15 years of research experience focused on plant-microbe interactions, primarily involving fungal pathogens and, more recently, nematodes and microbial biocontrol agents. I obtained my PhD in Biology from the University of Málaga (UMA) with an FPI fellowship (Spanish Ministry of Science and Innovation), working on the biotrophic fungus *Podosphaera xanthii* (cucurbit powdery mildew), where I gained solid expertise in fungal biology, virulence factor characterisation and fungicide resistance management in horticultural crops.

I have more than five years of international postdoctoral experience in leading research environments:

At the Hebrew University of Jerusalem (HUJI, Israel), I spent four years studying *Botrytis cinerea*, focusing on its resistance mechanisms to plant antimicrobial compounds (such as glucosinolates and their derivatives) and on the characterisation of a biocontrol organism. This work led to several high-impact publications, including a first-author paper in *Nature Communications* and collaborative articles in *PNAS* and *Molecular Plant Pathology*.

At the University of Exeter (UK), I carried out a nine-month postdoctoral stay dedicated to elucidating the mode of action of azole fungicides on *Zymoseptoria tritici*, combining advanced microscopy with biochemical analyses.

Upon returning to Spain, I first held an internationally co-funded contract between the University of Málaga and Koppert Biological Systems (The Netherlands), working on bacterial biocontrol. I focused on *Bacillus velezensis*/*B. subtilis* and their interaction with phytopathogenic fungi and nematodes, identifying and characterising antifungal and nematocidal metabolites with clear agronomic potential. Subsequently, I obtained a highly competitive PAIDI 2020 postdoctoral contract (Junta de Andalucía), which has been crucial to consolidating my scientific independence and leadership. Within this framework, I have established my own research line on plant-microbe-pathogen interactions and act as Principal Investigator of a project aimed at identifying new key factors underlying the biocontrol activity of *B. velezensis* UMAF6639. In parallel, I am developing a modern *Botrytis*-centred line based on mutant collections, effectoromics and live-cell imaging (FunGlow).

Overall, I have participated in multiple competitive research projects in Spain, Israel and the UK, including one as PI, and authored 15 JCR-indexed articles, several as first, corresponding and/or senior author, some with notable media coverage (press and radio). My work bridges basic and applied plant pathology: from virulence, resistance to plant antimicrobials and effector function to biocontrol and fungicide mode-of-action studies.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

On the training side, I have co-supervised seven Master's theses, supervised five Bachelor's theses, and I am currently co-supervising a PhD thesis, contributing actively to the mentoring of young researchers.

In terms of scientific service and leadership, I serve on the editorial board of Frontiers journals, have been invited as Guest Editor for a Special Issue in Plants (MDPI) on biocontrol strategies against fungal plant pathogens, and act as a reviewer for numerous international journals and as an evaluator for R&D projects (e.g. EQA). This combination of research output, supervision, editorial work and evaluation activity reflects a co



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Ciencias agrarias y agroalimentarias

Nombre:

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RYC2025-055582-I

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Título:

Virology, Biofilms and Antimicrobial Resistance in Food Environments

Resumen de la Memoria:

My scientific trajectory has been defined by a continuous progression toward independence, international collaboration, and interdisciplinary leadership in environmental virology, antimicrobial resistance, and biofilm ecology. I began my career at IATA-CSIC, where I built a strong foundation in virology and food safety, developing innovative antiviral strategies and methodological tools that positioned me early on within international research networks. These contributions opened doors to collaborations across Europe, North Africa, and Latin America, and laid the groundwork for a career characterized by openness, interdisciplinarity, and global engagement.

During my postdoctoral stages at IATA-CSIC, the University of Valencia, and CEBAS-CSIC, I expanded my scientific scope toward environmental microbiology and phage-mediated antimicrobial resistance. This period marked a turning point in my independence: I introduced ddPCR and phage-associated ARG detection as new capabilities within VISAFELab, coordinated tasks across EU and international consortia, supervised students, and led methodological developments later adopted by regulatory and industrial partners. These experiences allowed me to move from technical research roles into positions of scientific leadership, managing complex interfaces between microbiology, virology, and environmental health.

My mobility has been a central driver of my career. In 2024 I transitioned to the USDA-ARS (USA), one of the world's leading institutions in food and environmental microbiology. Here I lead experimental design in projects on multispecies biofilms derived from produce-processing environments, integrating advanced microscopy, molecular biology, and systems-level approaches. This stage has consolidated my maturity as an independent researcher, reflected in manuscripts under review, strengthened transatlantic collaborations, advisory roles, and the coordination of an accepted symposium for the IAFP 2026 Annual Meeting—an emerging area that I am helping to shape at the international level.

The research line I propose builds directly on these experiences and connects my expertise in viruses, phages, antimicrobial resistance, and biofilms into a unified framework aligned with One Health, Farm-to-Fork, and EU/US food-safety priorities. My project aims to unravel how multispecies biofilms function as reservoirs for pathogens, viral particles, resistance genes, and microplastics-associated hazards. Specifically, the line will (i) characterize native microbial consortia from food and water industries; (ii) quantify the accumulation and release of enteric viruses; (iii) determine how bacteriophages mediate ARG transfer under food-processing stresses; and (iv) evaluate how microplastics reshape biofilm formation, viral persistence, and resistance-gene mobility.

By integrating controlled-flow biofilm reactors, infectivity and viability assays, qPCR/ddPCR, metagenomics, and data-driven risk modelling, the line will deliver mechanistic insight and practical tools for improving sanitation strategies and mitigating persistent microbial risks. Its impact spans scientific, industrial, and policy dimensions, strengthening Spain's leadership in environmental virology and microbial risk assessment while consolidating an independent and internationally connected research program.

Resumen del Currículum Vitae:

I hold a PhD in Food Science (University of Valencia, 2021, Excellent Cum Laude), awarded the Extraordinary PhD Prize and the Best Thesis Award from the Spanish Society of Microbiology. My scientific career spans virology, food safety, environmental microbiology, antimicrobial resistance, and biofilm research, integrating molecular biology, microscopy, and advanced detection methods.

I have developed my career across leading institutions including IATA-CSIC, CEBAS-CSIC, the University of Valencia, and currently USDA-ARS (USA), totaling more than eight years of competitive research experience. I have participated in 24 competitive research projects, including six international initiatives funded by the EU, JPI Oceans, EFSA, and the U.S. Center for Produce Safety. My contributions span antiviral strategies, pathogen inactivation, microbial contaminants in aquatic environments, and antimicrobial resistance gene dissemination.

I am currently involved in two major international projects at USDA-ARS (NIFA and CSIC-USA-EPA-Laval-Montana consortium). I have also submitted independent proposals as Principal Investigator, including VIRBIOF (GenT, under evaluation) and RADIANT (BBVA), demonstrating growing scientific independence. My publication record includes 52 papers (44 published; 43 in SCI journals), 16 as first author and several as corresponding author, with more than 1,200 citations and an H-index of 20. Nine of these publications arise from international collaborations involving 29 foreign co-authors, reflecting strong international integration. I regularly serve as reviewer for journals in food microbiology and virology and have contributed two invited reviews as corresponding author. I have delivered 36 conference contributions (30 international, 13 oral) and received three best-poster awards. My work has been recognized by the CPS Professional Development Award (2024), highlighting scientific leadership and global impact. I have organized and co-chaired scientific events, including an accepted symposium for the IAFP Annual Meeting 2026 and a symposium for FEMS, demonstrating experience in scientific leadership and community building.

My career includes substantial technology-transfer activity, with 32 R&D contracts and collaborations with industry partners in areas such as disinfection strategies, virucidal coatings, and wastewater surveillance. I have served as a technical auditor for the Spanish National Accreditation Body (ENAC), advising on virological standards and laboratory practices. I have a strong commitment to mentoring and research training: I have co-supervised one PhD thesis (international mention, awarded by the Real Academia de Doctores de España), seven master's students, two bachelor's theses, and



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

five vocational trainees. I also contribute to international outreach and science communication as a representative of Spanish Scientists in the USA (ECUSA) in Washington DC, participating in workshops, educational events, and public-engagement initiatives.

Overall, my CV reflects an international trajectory, leadership in multidisciplinary research environments, active participation in global scientific networks, and a strong record of publications, technology transfer, and competitive funding, positioning me as a consolidated early-career researcher with growing independence.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: SUBIRATS MEDINA, JESICA
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Título: Advancing Environmental AMR Science for Safe Circular Agriculture

Resumen de la Memoria:

I am an internationally recognised microbiologist with over 10 years of experience studying the environmental dimensions of antimicrobial resistance linked to circular-economy practices in agriculture, including wastewater reuse and organic fertilisation. My work integrates environmental microbiology, metagenomics, qPCR panels, microbial risk assessment and quantitative modelling to elucidate how antibiotic-resistant bacteria (ARB), antibiotic resistance genes (ARGs) and pathogens move across the water-soil-crop-human interface. My scientific trajectory began during my PhD at the Catalan Institute for Water Research (ICRA), where I investigated the key factors driving the dissemination of ARGs and ARB in the environment. My thesis received the Extraordinary PhD Award and the Best Thesis in Microbiology (SEM), and included two international research stays that strengthened my methodological expertise and produced high-impact first-author publications. My postdoctoral stage at Agriculture and Agri-Food Canada during 3 years, one of the world's leading centres in agricultural AMR, marked a decisive shift toward agroecosystems. Working under the mentorship of Dr. Edward Topp, I identified key pathways of AMR transfer associated with manure, compost and digestate applications and uncovered overlooked high-risk microorganisms such as spore-forming bacteria. This work shaped my scientific identity and established me as a young independent expert in agricultural AMR, leading to six first-author publications and enduring international collaborations. Since joining IDAEA-CSIC in November 2021, I have built an independent research line that bridges environmental microbiology, agriculture and One Health. My group investigates how reclaimed water, biosolids and manure treatments shape soil and crop microbiomes and quantifies the associated human exposure. This line responds directly to major EU priorities, including the Farm-to-Fork Strategy, the EU AMR Action Plan and Regulation (EU) 2020/741, where AMR remains a critical regulatory gap. A distinctive feature of my research is its strong translational and policy-relevant dimension. My recent ES&T study, where I am last and corresponding author, provides one of the first scientific bases for defining sentinel ARG families suited for monitoring reclaimed water and treated sludge. Complementarily, my work on risk-reduction strategies for organic fertilizers and the new line addressing AMR dissemination in aerosols (in collaboration with ISGlobal) further advance evidence-based criteria needed for safe circular-economy practices. Currently in the final year of my Marie Curie Fellowship, I have secured over €900K in competitive funding, including three projects as PI (one as Coordinator-PI), 4 R&D contracts, and several prestigious fellowships and mobility grants. This support has enabled the consolidation of a growing research group and a strong international network with INRAE (France), SLU (Sweden), HZAU (China) and CFIA (Canada). My vision for the RYC is to consolidate IDAEA-CSIC as a reference centre for AMR risk assessment in circular agriculture and to deliver evidence-based tools, sentinel ARG panels and regulatory criteria to support EU decision-makers and stakeholders.

Resumen del Currículum Vitae:

I carried out my PhD thesis at the Catalan Institute for Water Research (ICRA), obtaining the extraordinary PhD award, and the best thesis in the field of Microbiology by the Spanish Society of Microbiology. During this stage, I published papers as a main author that are considered reference in my field expertise (in the 97th percentile of citations). I completed two predoctoral stays, at the University of Lyon (3 months) and the CNR-IRSA research center (4 months), resulting in a first-author publication from each. In 2018, I joined Dr. Edward Topp's group at Agriculture and Agri-Food Canada (London, Canada) for three years as a postdoc, resulting in six first-author publications. Since November 2021, I have been working at the Institute of Environmental Assessment and Water Research (IDAEA-CSIC), where I have established a new research line focused on understanding and mitigating the environmental dimension of AMR arising from circular-economy agricultural practices. Since joining IDAEA, I have secured over €900K in research funding, which has enabled me to build a growing research group. This funding includes: three competitive projects as PI including ARGUS, BIORISK (PID2022-143135OB-I00) and GreyWaterBCN (as Coordinator-PI) projects, with a total funding as PI of €486K; three prestigious postdoctoral grants: Juan de la Cierva Formación (2019, €50,000), Beatriu de Pinós (2021, €143,300), and the Marie Curie Fellowship (2022, €181,152.96), and 4 R&D&I contracts with public and private entities totaling €40K. In addition, I have been awarded with four mobility grants, including the EMBO Scientific Exchange Grant, totaling €12K. In total, I have participated in 3 national and 11 international projects. My research has been published in 33 peer-reviewed papers (40% first authorship, 22% as a corresponding author, 3% last author) and 1 book chapter, attracting >1560 citations, with h-index 17 (Scopus). I am the official co-supervisor of 3 PhD students, including one as main supervisor funded through my national project as PI, and sole supervisor of 6 master's students (2019-2025). I have fostered new international collaborations with the National Institute for Agricultural Food and Environment (INRAE, France), where I recently completed a 3-month stay, and with the Swedish University of Agricultural Sciences (SLU, Sweden), where I plan to undertake three research stays this year. I am also actively collaborating with the Huazhong University in Wuhan (HZAU, China) and Canadian Food Inspection Agency (CFIA, Canada). I have participated in 28 international conferences, and I have been invited speaker at different scientific events organized in Spain, France, Chile, and one international workshop. I was recently invited to moderate a Parliamentary session held at the Spanish Congress of Deputies in Madrid (May 2025) and I have participated in different outreach activities such as Science is beautiful (Brussels, 2026), European Night of Research (2022), Pint of Science (2025). I belong to the Seminar Commission at IDAEA-CSIC that invites researchers and non-researchers to communicate their research biweekly. I have evaluated two international research projects (Bolivia, 2022; France, 2024), served on a PhD evaluation committee (UPC, 2023), I have been a member of the committee evaluating a PhD research plan/ thesis (UVIC, 2025, UCA, 2025).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: BENLLOCH TINOCO, MARIA
Referencia: RYC2025-055799-I
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Título: Estrategias emergentes para el diseño de microestructuras alimentarias
Resumen de la Memoria:

My research trajectory is defined by the development of mechanistic, structure-driven strategies to engineer the nutritional and techno-functional properties of food materials, with a particular focus on starch digestibility and emerging processing and reformulation approaches. Trained as a food scientist in Spain and internationally through the UK and Luxembourg, I have progressively built an independent and internationally recognised research profile at the interface of food processing, polymer science and multi-scale food structuring.

My early work resolved a long-standing methodological limitation in the comparison of microwave and conventional thermal processing by introducing mathematical approaches to demonstrate the superiority of microwave processing for preserving nutritional quality in fruit matrices, laying the foundation for several highly cited publications. During my postdoctoral training at the EPSRC Centre for Innovative Manufacturing in Food (UK), within a world-leading polymer science environment, I expanded my expertise to the design of food structures and co-led industry-funded projects addressing reformulation challenges in bakery and convenience foods. This period consolidated my ability to integrate fundamental research with industrial translation.

Since joining Northumbria University as Assistant Professor, I have established and led an independent research programme centred on engineering food structures with controlled digestibility and techno-functionality. My work has demonstrated how non-thermal technologies and targeted ingredient interactions at the molecular level modulate bioaccessibility, digestibility, mechanical and rheological behaviour, and storage stability of foods. Key contributions include: i) redefining the role of crosslink heterogeneity in alginate networks; ii) establishing non-thermal strategies for the sustainable depolymerisation of food polysaccharides with prebiotic activity; and iii) providing new mechanistic evidence of how starch-polyphenol interactions modulate digestibility, challenging long-held assumptions. These advances are reflected in 25 peer-reviewed publications, a strong corresponding-author profile, invited international talks, and sustained industry engagement. My research has attracted over £850,000 in competitive funding, supported the training of PhD students and postdoctoral researchers, and generated tangible societal impact through collaborations with SMEs aimed at improving the nutritional profile and sustainability of everyday foods. I have also supported the development of the food science research community through teaching leadership, outreach, open research practices and editorial service.

My next research phase will focus on reconstructing starch architecture using model systems to identify the structural variables governing digestibility and techno-functionality. By integrating advanced structural characterisation, computational modelling and processing technologies, I aim to move beyond observational descriptions towards predictive design of starch-based materials. This programme will advance the field of starch modification, validate functionality in industry-relevant food systems, and support the development of healthier staple foods with clear commercial and public-health relevance.

Resumen del Currículum Vitae:

Trained as a food scientist at Universitat Politècnica de Valencia (Spain), my path towards scientific independence began with the competitive VALi+d fellowship, which enabled me to undertake an international PhD. My doctoral research developed novel methodologies to demonstrate the superiority of emerging processing technologies in food preservation. This work advanced mechanistic understanding of microwave-enhanced thermal effects on shelf-life of ready-to-eat fruit matrices, earned the UPV Doctoral Prize, and supported an international collaboration with the Centre de Recherche Public-Gabriel Lippmann (Luxembourg). As a postdoctoral researcher, I joined Prof. Foster's group within the EPSRC Centre for Innovative Manufacturing in Food (UK), a leading interdisciplinary hub. There, I expanded my research into the design of healthier bakery products and co-led industry-funded projects focused on sugar and fat reduction through novel formulations and processing strategies. These activities strengthened my capacity to integrate fundamental research with applied innovation. Alongside research, I contributed over 200 h of teaching to the BSc Food Science programme and co-developed, with the Institute of Food Science and Technology (IFST), a professional competency framework adopted by UK universities. Since joining Northumbria University as Assistant Professor and Director of the BSc Food Science and Nutrition, I have established an independent research line on sustainable processing approaches to engineer food materials with controlled multi-scale structure and digestibility. I have secured over £850,000 in external funding, including major awards from BBSRC and UKRI, supporting international collaboration across Spain, UK, Canada and Italy, and reinforcing my leadership in the field. My research also delivers tangible societal impact. I have led commercial research (£29,905.67) enabling SMEs to implement reformulation and shelf-life strategies integrated into product development pipelines. Through partnerships with Biomara and AgriFoodX, my work has contributed to improving the nutritional profile of widely consumed food staples while advancing the valorisation of seaweed and fruit co-products as functional ingredients, supported by shelf-life studies, prototyping and technical reports. I have championed Open Research practices for nearly a decade, ensuring accessibility of methods, data and outputs, with over 90% of my publications Gold Open Access. Mentoring and capacity building are central to my contribution. I have supervised PhD students and PDRAs, examined international PhD theses, and chaired conference sessions (Applied Sciences Annual Conference). I have also fostered research culture through outreach programmes delivered with the Food Teachers Centre, regional schools and the Life Science Centre. I contribute to the scientific community as a guest editor and reviewer for leading journals, and through committee service with IFST. My teaching and academic leadership have been recognised through Fellowship of the Higher Education Academy, accreditation as Contracted Lecturer and IFST Fellow. I continue to strengthen my translational profile, most recently through application to the competitive Royal Society Research Industry Fellowship. Overall, my trajectory demonstrates scientific independence, leadership and maturity.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: MARQUEZ MOLINS, JOAN
Referencia: RYC2025-056374-I
Correo Electrónico: joanmarquez21@gmail.com
Título: From viroid biology to RNA-driven stress resilience: a research trajectory in RNA regulation in plants

Resumen de la Memoria:

From my doctoral training to my current postdoctoral stage, I have contributed to understanding RNA-mediated regulation in plants, with a particular focus on viroids, non-coding RNAs, RNA modifications, and stress responses. My PhD work, supported by a competitive fellowship, led to major advances in viroid research, including an innovative cloning strategy (P1), comprehensive pathogen profile (P2), the exploration of viroid coding potential (P3), and the development of a viroid-based gene-silencing tool (VdIGS, P4). I further produced the first integrative temporal multi-omics map of plant responses to viroid infection (P5). These achievements established the foundation for subsequent investigations, as a postdoc in Sweden, into epigenetic regulation during infection (P8), the occurrence of RNA modifications in viroid and viral genomes (P6), and a conceptual perspective on the expanding diversity of infectious circular RNAs (P7). Complementary to this, as PhD co-supervisor, I contributed to the identification of long non-coding RNAs in cucurbits (P9). Finally, I have been focused on my MSCA project (UNROOT) that aims to understand the biogenesis and role of tRNA derived small RNAs in plants. The first output of the project is their characterization in male reproductive tissues, where they over accumulate to maintain translation inhibition and thus guarantee the correct progression of this essential developmental process (P10).

My work has consistently followed open-science principles through open-access publishing, public deposition of datasets, and dissemination of scripts and pipelines to ensure reproducibility and community accessibility. I have actively promoted scientific outreach through public engagement events, social media management for the viroid research community, and interactions with industry and biotechnology stakeholders. Several of my results have potential translational applications, including methodological tools for viroid research and lncRNA resources for crop improvement.

International mobility has been central to my career, through my transition to the Swedish University of Agricultural Sciences (SLU), where I expanded my expertise into epigenetics, plant development, and abiotic stress responses. The MSCA Postdoctoral Fellowship (UNROOT) has enabled me to develop my own project, implementing new methodologies and establishing a growing network of collaborators. My increasing independence is reflected in my roles as corresponding author, grant holder, and co-supervisor of PhD and undergraduate students, as well as PI of competitive research projects.

Building on this foundation, my future research line (DePART) aims to decode RNA-mediated regulatory networks governing plant stress responses and to engineer RNA-based strategies to enhance crop resilience. By integrating high-resolution molecular analyses with synthetic biology approaches, my goal is to generate fundamental knowledge and develop innovative tools that contribute to sustainable agriculture under accelerating climate constraints.

Resumen del Currículum Vitae:

I am currently Marie Skłodowska Curie Postdoctoral Fellow at the Swedish University of Agricultural Sciences (SLU). My research focuses on understanding the role of small RNAs in plants under stress, specifically small RNAs derived of transfer RNAs (tsRNA). I conceived the project UNROOT, because we still lack a clear understanding about their biogenesis pathways and the specific functions of these molecules.

My professional research trajectory started with a competitive fellowship (ACIF2017) from the Generalitat Valenciana (GVA) in the laboratories of Gustavo Gomez and Vicente Pallas. There, I researched about viroids, exploring new hypothesis, producing a comprehensive analysis of viroid-host interactions and developing new technologies. This experience in laboratories of two institutes: I2SysBio and IBMCP offered me the possibility to interact with experts in systems biology and plant molecular biology, respectively. Therefore, I acquired an interdisciplinary background that allows me to tackle complex biological questions.

My first internationalization experience with a short stay as a visiting researcher to the Martinez lab in SLU to add a profundity layer to my previous time-scale analysis of viroid infection. Therefore, I started the project to study histone repressive marks to expand the previous multi-omics analysis. During my postdoc, I continued this work and initiated new projects related to small RNAs and RNA modifications, including the MSCA-funded project. Since starting my PhD training, I have been actively engaged in disseminating and communicating my research and the importance of science to a variety of audiences. For this, I have been involved in different outreach activities (Fascination of Plants day, Expociencia²), being the main coordinator of our department in SciFest Uppsala 2025, and participated in press interviews (e.g. <https://www.nature.com/articles/d41586-024-00266-7>). Currently I am a member of the board of the MCAA (Marie Curie Alumni Association) Swedish chapter. Moreover, during my career I have mentored several graduate and undergraduate students in the laboratory, including the direction of three final degree projects and now I am co-supervising two PhD students. Additionally, I have been corresponding author of several publications, highlighting my independence. Nonetheless, I have been external reviewer of the thesis of Beltran Ortola (UPV, 2023) and reviewer for several journals (Molecular Plant Pathology, Plant Methods, Scientific reports etc). Finally, I have been guest lecturer in the CRISPR course for Organism Biology PhD school at SLU.

Overall, my research trajectory has provided me with important scientific competences that are the basis to establish my own research line aiming to study RNA-mediated regulation in plants under stress to develop biotechnological solutions.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: RÍOS COVIÁN, DAVID
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Título: Interacciones dieta, microbiota y hospedador

Resumen de la Memoria:

El candidato realizó su tesis centrándose en el estudio de las interacciones metabólicas entre miembros de la microbiota intestinal. En particular, en la producción de metabolitos bacterianos como los ácidos grasos de cadena corta (AGCC) y los ácidos grasos de cadena corta ramificados (AGCCR). Uno de las principales conclusiones de este periodo fue que la microbiota se puede modular mediante la composición de carbohidratos y proteínas de la dieta. Después, realizó una estancia posdoctoral trabajando en un centrado en el estudio de la inmunidad y la integridad del DNA de la mucosa intestinal mediada por la proteína APE1. En este contexto, se tuvo en cuenta las relaciones microbiota-hospedador. En una segunda etapa postdoctoral, el candidato estudió los efectos de la cesárea en la microbiota intestinal y en el sistema inmune del neonato mediante el desarrollo de modelos murinos axénicos. Además, se centró en el desarrollo de intervenciones basadas en probióticos para revertir estos efectos. Finalmente, el candidato se incorporó a una spin-off del CSIC como director técnico del departamento de I+D, donde ha desarrollado su faceta como investigador principal de varios proyectos de financiación competitiva para el desarrollo de terapias basadas en microbiota como adyuvantes a la inmunoterapia. En todas las etapas de su formación, el candidato ha tenido muy presente la interacción entre metabolismo bacteriano e interacción con el hospedador mediante la modulación del sistema inmune, que es un tema recurrente en toda su trayectoria científica. Gracias a eso, la línea de investigación a desarrollar se centra en el estudio de la fermentación colónica de proteína desde un enfoque multidisciplinar. Tanto en la identificación del perfil aminoacídico de la dieta, las bacterias productoras de metabolitos nocivos y el diseño de intervenciones dietéticas sostenibles, basadas en evitar este fenómeno potencialmente peligroso para el huésped.

Resumen del Currículum Vitae:

El candidato defendió su tesis "Interacciones entre bifidobacterias y otros miembros de la microbiota intestinal humana" en 2016, recibiendo la calificación "cum laude" y mención internacional por la Universidad de Oviedo. Además, recibió el premio extraordinario de doctorado. Es autor de 25 artículos, de los cuales es primer autor del 55%, correspondiendo del 15% y último autor de un 4%. Entre estos artículos se encuentran 4 citados en el percentil 99 o mayor. El candidato ha participado en varios congresos tanto nacionales como internacionales donde ha presentado su investigación tanto en formato poster como charlas. Además, es IP de varios proyectos de concurrencia competitiva, tanto nacionales como internacionales que suman más de 400.000\$ en financiación. La mayoría obtenidos durante su etapa como Director Técnico en el departamento de I+D de Microviable Therapeutics, spin-off del IPLA-CSIC. El candidato además ha participado en varias actividades para la divulgación de la ciencia, como participación en la "semana de la ciencia" o "STEMing for success" en la Universidad de California San Diego (UCSD).



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: URRUTIA ROSAURO, MARÍA
Referencia: RYC2025-055316-I
Correo Electrónico: m.urrutia@csic.es
Título: Multidisciplinary approaches to plant breeding

Resumen de la Memoria:

Mi carrera científica ha girado en torno a la mejora vegetal, la identificación de QTL de interés agronómico y la puesta en valor de los recursos fitogenéticos mediante identificación de variabilidad genética en especies relativas silvestres de cultivos.

Realicé mi tesis doctoral en el Centro de investigación en Agrigenómica (CRAG) trabajando con poblaciones biparentales de fresa, marcadores moleculares y técnicas metabolómicas puede realizar estudios de cartografiado de QTL de caracteres nutricionales y organolépticos en esta especie. A continuación realicé mi primera estancia postdoctoral en el INRA (Francia) donde trabajé en desarrollo de marcadores metabólicos de tolerancia a estrés abiótico en maíz y girasol.

Esto me llevó a incorporarme al departamento de biotecnología de una empresa neerlandesa obtentora de variedades vegetales, Enza Zaden S.L. Durante este periodo tuve la oportunidad de conocer el sector en profundidad y obtener una visión global de los programas de mejora.

A continuación decidí incorporarme al grupo del Dr. David Posé en la Universidad de Málaga-IHSM para retomar los estudios genéticos con fresa, esto me permitió realizar análisis de asociación del genoma completo variabilidad para el perfil de volátiles de la fresa silvestre Europea identificando y validando múltiples enzimas de biosíntesis de dichos compuestos.

Finalmente me incorporé al grupo de mejora de hortalizas del CSIC-IHSM integrándome dentro del grupo de tomate donde he podido tomar el liderazgo en las líneas de investigación enfocadas a la mejora de la arquitectura de la planta y la calidad del fruto.

Resumen del Currículum Vitae:

Licenciada en Biotecnología, Universidad Autónoma de Barcelona (UAB, 2010)
Máster en biotecnología vegetal (UAB, 2011) y estudios de postgrado en Bioestadística (UNED, 2013)
Doctora en biotecnología vegetal (UAB, 2015) con la supervisión de Dra. Amparo Monfort en el Centro de Investigación en Agrigenómica (CRAG). Excelente cum laude, mención internacional y Premio Extraordinario de Doctorado.

Contribuciones científicas
He co-autorizado 15 publicaciones científicas de las cuales 12 son artículos de investigación (dos en pre-print), un artículo corto, una revisión y un capítulo de libro.
Firmo como primera autora 9 de ellas y una como última, dos como autor de correspondencia. Además, he contribuido a bases de datos públicas con sets de datos metabolómicos y transcriptómicos obtenidos en 4 proyectos diferentes.
He presentado mi trabajo en 29 congresos nacionales e internacionales y soy organizadora del XII Congreso de Mejora Genética de Plantas (SECH-SEG) 2026.

Financiación y contratos
Realicé mi tesis doctoral con un contrato para la formación del personal investigador (FPI) (2011-2015)
posteriormente obtuve una beca postdoctoral competitiva de atracción de talento de la Junta de Andalucía (2021-2023)
y me incorporé al grupo de hortalizas del IHSM a través del programa QUALIFICA (Junta de Andalucía)(2023-2025)
Finalmente obtuve financiación para establecerme como investigadora independiente través del programa EMERGIA de la Junta de Andalucía (2025-2029)
He sido titular de un contrato de I+D con la empresa privada HuertaValle Híbrido (2023-2025)

Contribuciones a la sociedad
He co-dirigido un TFG (curso 2019/20) y dos TFM (cursos 2023/24 y 2024/25)
He impartido docencia en nivel de grado en la Universidad de Málaga (134h entre 2019 y 2023)
He participado y organizado de forma regular actividades de divulgación científica (Amgen TransferCiencia, ScienceES, noche de los investigadores, noche en las aulas, día de la mujer y la niña en la ciencia, Juega con la Ciencia)
He participado como ponente en los cursos de verano de la Universidad Pública de Navarra (2019)
He sido tribunal de una tesis doctoral (2020) y colaboro como revisora para revistas de las áreas de Agronomy y Plant Science



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: SELMA ROYO, MARTA
Referencia: RYC2025-056574-I
Correo Electrónico: marta_01.02@hotmail.com
Título: Unlocking the Diet–Microbiome Link to Promote Maternal–Infant Health

Resumen de la Memoria:

My career has focused on understanding how the maternal–infant microbiome shapes early-life health, with particular emphasis on the perinatal factors. My early studies provided foundational insights into the human milk microbiome and were among the first to explore how maternal diet, lifestyle, and perinatal environment influence the maternal–neonatal gut microbiome and immune system development.

My PhD, carried out in close collaboration with healthcare professionals and nutritionists, produced clinically relevant findings and strengthened the translational dimension of my research. Following my PhD, I joined the Computational Metagenomics laboratory led by Prof. Nicola Segata (CibioCM, University of Trento, Italy), where I significantly expanded my computational expertise and opened a new experimental line that did not previously exist in the group. This work led to major contributions, including the metagenomic characterisation of perinatal factors affecting bacterial vertical transmission and the creation of the CibioCM bacterial collection, now utilised for species discovery and international collaborative projects. Subsequently, I transitioned to BCNatal (IDIBAPS) with a highly competitive Sara Borrell Fellowship (ranked 1st nationally), where I contributed the development of the microbiome line within a clinical setting. Across these stages, I have generated large-scale metagenomic and genomic datasets and isolated numerous microbial strains, all openly available to the scientific community. My nearly three years of international research, especially my postdoctoral work at CibioCM, were crucial for building a strong interdisciplinary network spanning computational and experimental microbiologists.

After that, I secured my position as senior postdoc in Prof. M Carmen Collado's group (IATA-CSIC) with my own project funded by the Marie Skłodowska-Curie Individual Fellowship (DIAMMOND) focused on the interplay between diet and gut microbiome during pregnancy. My long-term scientific vision centers on the underexplored role of maternal diet during pregnancy, the molecular mechanisms through which dietary components influence gestation via microbial metabolism, and the societal importance of advancing research in women's health. To address these challenges, I propose an integrated computational–experimental framework–from a food science perspective–to identify bacteria-derived metabolites and molecular pathways that mediate diet–microbiome–host interactions. My interdisciplinary background, spanning food science, microbiology, computational modelling, and clinical research, uniquely positions me to tackle this challenge. I aim to establish a research line that identifies bacteria-derived metabolites and molecular pathways mediating maternal diet–microbiome–host interactions. To achieve this, I propose an integrated methodological framework that combines: 1) computational approaches, 2) experimental validation, (3) food science tools and (4) in vitro and translational models connected to pregnancy physiology. Ultimately, my goal is to provide mechanistic, evidence-based foundations for personalized nutritional strategies and novel applications that improve maternal health and pregnancy outcomes.

Resumen del Currículum Vitae:

Throughout my career, I have progressively consolidated an independent research profile focused on the maternal–infant microbiome, integrating experimental, computational, and translational approaches. I obtained my PhD in Biotechnology at the Polytechnic University of Valencia (2020, UPV) through a competitive fellowship from the Generalitat Valenciana. My doctoral work, recognized with awards from the UPV and for the Spanish Microbiology Society, generated clinically relevant insights into women's health and included a research stay at Imperial College London. My subsequent postdoctoral position in Prof. Segata's Computational Metagenomics group (University of Trento, 2021–2024) was pivotal in shaping my career. I established a new wet-lab line in a purely computational group, leading to the development of the CibioCM bacterial collection and several high-impact publications (Nature, Nature Microbiology, Cell Host & Microbe). I later joined BCNatal–IDIBAPS (2024–2025) as a Sara Borrell Fellow (ranked 1st), where I expanded the microbiome program within a clinical environment. My work directly informed improvements in pregnancy care, evidencing my capacity to lead translational research.

I secured my current position at IATA-CSIC with a Marie-Curie Individual Fellowship (200K), for which my project received the maximum score (100/100). This fellowship strengthens my independence by establishing my own research line on the interplay between maternal diet and gut microbiota during pregnancy. Beyond this, I have acted as Co-PI of the GUTSY project (15K) and in an industry contract with Royal Canin (France), evidencing my capacity to transfer knowledge beyond academia. Altogether, I have secured over €200,000 as PI, reflecting my scientific maturity. My commitment to mentoring is equally strong. I have formally supervised five BSc/MSc theses (1 ongoing) and currently co-supervise two PhD theses in the Biotechnology program at UPV. Several of my former students have progressed to PhD or research assistant positions, illustrating the effectiveness of my supervision. I also teach in the Master's in Human Microbiota and Health (University of Barcelona) and serve as reviewer for high-impact journals (Gut Microbes, EBioMedicine) being selected as evaluator for the ERC Starting Grant 2025 call, signaling international recognition of my expertise. At CSIC, I am part of the Microbiome Connection network, where I serve on the Organising Committee of the Junior Hub Mentoring Programme. I actively engage in a wide range of science outreach activities, especially sessions in High-school Centres (more than 6 in the last years). I participated in several Open-door days from Valencia Science Park, CSIC and local campaigns.

Across my four research stages, I authored 56 publications, 37 as main author; 2 as corresponding author (2 more in revision) (H-index 23; >2300 citations; 30% D1) some in top-ranked journals (Nature, Nature Microbiology, Cell Host&Microbes), 7 reviews (Nature Biotechnology, Trends Food Sci Tech) and 5 book chapters. I am regularly invited to speak at clinical and scientific conferences (9 invited talks) and I participate in 5 national and 3 European projects. Overall, my trajectory demonstrates a clear evolution towards scientific independence, leadership, and the creation of innovative research lines with strong translational impact.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: VANELLA, DANIELA
Referencia: RYC2025-056634-I
Correo Electrónico: d.vanella@yahoo.it
Título: Explore the effects of sustainable management practices in Mediterranean agriculture on water and surface energy balance using multi-data source methodologies

Resumen de la Memoria:

My research activity (2013-25) has been established in internationally-recognized research centres in Italy (UniCT, 12 years), United Kingdom (Lancaster University, 5 months), United States (University of California, Davis, 4 months), and Spain (CIDE-CSIC-UV-GVA Valencia, 3.5 months).

My research focus is mainly addressed to explore the effects of the adoption of sustainable agricultural management practices (e.g., DI regimes and organic mulching) in Mediterranean climatic conditions on the SPAC dynamics using multi-data source methodologies in combination with modelling and ancillary information (e.g., Saitta et al. 2021; Vanella et al. 2025). Special emphasis of my research career has been devoted to couple the use of near-surface minimally invasive geophysical surveys together with lean monitoring technologies for tracking the soil and crop water status (e.g., Guarrera et al. 2024; Toscano et al. 2025; Vanella et al. 2021a). My research line provides useful and promising insights for characterizing the soil-plant-water interactions at different spatial and temporal scales (Vanella et al. 2018, 2021b; 2022a, b). Notably, I have been developed adjusted satellite-based modelling approaches for improving the estimations of SEB fluxes (Consoli and Vanella 2014a; Vanella and Consoli 2018; Ramírez-Cuesta et al. 2022) and crop ET at different spatial scales, e.g. from the plot to the regional scale (e.g., Consoli and Vanella 2014b), by combining multiple approaches, as for example soil moisture derived information by electrical imaging with RS-based models (Vanella et al. 2019); water balance model, point-based soil moisture measurements, micrometeorological and RS-based information (Consoli et al. 2016); geophysical and sap-flow data (Vanella et al. 2018); and eddy covariance, sap flow, and FAO-56 methods (Saitta et al. 2020). Recently, I have explored the potential of alternative agrometeorological data sources, such as weather forecasts (NWP) and climatic reanalysis products (ERA5/ERA5L), for ET estimation (Vanella et al. 2022c) also coupled with RS observations (Longo-Minnolo et al. 2020, 2022).

As scientific-technical achievements, since 2014 I have co-authored 54 ISI contributions (46 articles and 8 conference articles, SCOPUS, Dec-25), 55 works presented at international and Italian congresses and 7 contributions in books. From the 46 ISI articles, 36 (78%) and 19 (41%) are, respectively, Q1 and D1 ranked (JCR). In 65% of them I have played a relevant role, acting as First, Senior (Last) or Corresponding Author (AC). Most of the findings of my research activities have provided new insights and original contributions for the development of the novel agrogeophysics line applied to the sustainable agricultural management in Mediterranean contexts. My contributions have high impact on the community as can be evidenced from the number of citations, with a total of 1,122 citations by 833 different sources, resulting in an H index of 21 (SCOPUS, Dec-25), highlighting some relevant articles that collected, in average, more than 25 (Vanella et al. 2022), 16 (Longo-Minnolo et al. 2022) and 10 (Saitta et al. 2021) citations per year. Additionally, one of them has received the 2022 Best Paper Award from the American Society of Civil Engineers (Saitta et al. 2020).

Resumen del Currículum Vitae:

I am an assistant professor in tenure-track (RTD-B, the Italian equivalent to RyC Spanish contract) of Agricultural hydraulics and watershed protection at UniCT in Italy. My background is oriented to the Earth Science and Environmental engineering field. In 2017, I received the International PhD in Agriculture, Food and Environmental Science at UniCT with the thesis Monitoring and modelling transfer processes in the soil-plant-atmosphere continuum across scales. During my PhD (2013-17), I performed 2 research visiting stays (5 months) at the Lancaster University in UK, under the supervision of prof. Binley.

My research career has been developed in the framework of 20 competitive research projects, including 7 international (e.g., HANDYWATER), 12 Italian (e.g., Water4AgriFood) and 1 Spanish (E-STRESS), in which I participated as research collaborator (2013), PhD (2013-17) and PostDoc researcher (2017-25), and as Principal Investigator (PI) (in 2 of them). I have also been the PI of 13 technology and knowledge transfer contracts with private companies and foundations. I have organized 30 R&D activities designed for multiple end-users.

During my career, I have acquired consolidated experience in academic teaching (9 years at UniCT) leading subjects as Bio-engineering (2017-18 and 2019-20) and Water management precision irrigation techniques (2020-22; 2024-26).

In 2017, I received the honour fellowship to the Agricultural Hydraulics sector from UniCT. I obtained the associate professor (2018) and full professor (2023) qualifications from the Italian Ministry of University and Research and, in 2023, the qualifications as profesor contratado doctor, profesor ayudante doctor and profesor universidad privada from the Spanish Agency for Quality Assessment and Accreditation.

In 2019-2022, I got a PostDoc scholarship within the competitive AIM initiative. During this initiative, I conducted research stays at University of California Davis (UC Davis, 4 months), within the research group headed by prof. Kisekka, and at the CIDE-CSIC-UV-GV in Valencia (Spain, 2.5 months), within the research group of Dr. D. Intrigliolo. In 2023, I obtained a fixed-term assistant professor (RTD-A) at Di3A of the UniCT (Italy).

In parallel (2017-2025), I mentored 2 PhD candidates, 5 MSc and 3 Bachelor students, and 2 Brazilian visiting researchers at UniCT. I also participated at evaluation committees at UniCT (14 in 2021-25), at the PhD Thesis Tribunal at UMH in Spain (2025) and acted as external evaluator of 3 PhD theses.

I am Associate Editor of Irrigation Science journal (Q1) and Editorial member of Remote Sensing (Q2) and Atmosphere (Q3) journals. I act as convener at the EGU 2022-26 conferences (Austria), organizer, member of the scientific committee and moderator of the international RAWSENSE workshop at CEBAS-CSIC (Spain), and member of the scientific committee of the AISA II Conference (Italy). I am member of the AIIA and EGU.

Recently, in 2025, I performed another one-month research stay at the CIDE-CSIC-UV-GV with the research group of Dr. E. Gimeno-García. During this stay, I reinforced the already active collaboration with the group of Dr. J. Pérez-Pérez at IVIA (Valencia). Additionally, I have submitted my candidature to the Spanish R3 certificate as established researcher and I have been nominated as coordinator of the Italian group on irrigation studies.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: LÓPEZ RUIZ, ROSALIA
Referencia: RYC2025-054371-I
Correo Electrónico: rlr468@ual.es
Título: Use of advanced analytical tools for the development of non-targeted analysis methods focused on organic chemical hazards and metabolites in agri-food systems

Resumen de la Memoria:

Since the beginning of her career as researcher, she has carried out the development of a new and innovative research line for the group she works with. The candidate has focused her research trajectory on the use of advanced analytical tools, such as liquid and gas chromatography coupled with high-resolution mass spectrometry (HRMS), for the development of non-targeted analysis methods to detect contaminants in agri-food systems. To do this, the candidate has had to specialize in depth in this complex approach, use of specific software and specialized data processing tools. She has become an expert in this field and is developing analytical methodologies for the scientific community at the international level, as reflected in her large number of scientific publications.

She began her scientific career in 2016 as a pre-doctoral researcher in the Analytical Chemistry of Contaminants research group at the University of Almería (UAL), thanks to obtaining a competitive scholarship to carry out the development of her doctoral thesis financed by the university's own plan. During this time, she focused her research on the study of the behaviour of specific pesticides and their metabolites in food and the environment, applying chromatographic techniques coupled with HRMS and using both targeted and non-targeted analysis modes. Additionally, to meet the requirements of internationalization, the candidate carried out a research stay at the Institut des Sciences Analytiques in Lyon, France, where she applied the same analytical strategies learned during her thesis.

In December 2020, the candidate defended her thesis with a total of 12 scientific articles derived from it. The thesis was obtained with the highest possible grade (Outstanding cum-laude) and with an international mention. Upon finishing her thesis, and thanks to obtaining that competitive scholarship, she was financed for one more year as a postdoctoral researcher at the UAL, where she continued her research and went one step further into the complex field, this time focused on the study and characterization of plant protection products through non-targeted analysis focused on additives, impurities, and the active substance. In 2021 she obtained a competitive postdoctoral contract from the Andalusian Regional Government (PAIDI 2020) which she is currently enjoying at the UAL. During the postdoctoral period, the candidate has implemented her internationalization capacity with three stays at foreign centres (4 months in Brazil and 1 year and 3 months in Portugal) expanding her knowledge in other areas that she had not worked on until now such as cell cultures or food science. In addition, in 2024 she obtained funding in three competitive calls of the Own research plan of the University of Almería for three projects where she is the principal researcher.

To continue completing her scientific career in the field of non-targeted analysis, the candidate presents a new research line of high current interest such as short chain PFAS and its metabolites. She will go one step further in the field of agriculture, this time evaluating the presence of these emerging contaminants in agricultural soils and food samples, due to the high probability that these contain high concentrations of PFAS. She will employ her knowledge in non-targeted analysis and chromatography coupled to HRMS analyzers.

Resumen del Currículum Vitae:

Dr. Rosalia López Ruiz (h-index: 15, 790 citations) is a chemist specializing in advanced analytical methodologies for the detection and characterization of chemical contaminants in agri-food systems. She holds a Ph.D. in Chemistry (Cum Laude, International Doctorate, Extraordinary Award, University of Almería, 2020) and has received several distinctions, including the SEQA Miguel Valcarcel Young Researchers Award 2022, the GRASEQA Young Researchers Award 2022, the San Alberto Research Award 2022 and 2023, and the Best Research Article Award 2024 (UAL).

Since 2015, she has been a member of the Research Group "Analytical Chemistry of Contaminants" (FQM-170), and in 2022 she obtained a highly competitive three-year postdoctoral contract from the Junta de Andalucía. Despite her early career stage, she has published 74 SCI articles (25 as first author and 10 as corresponding author), four book chapters, and one patent, with more than 90% of her work in Q1-Q2 journals. Her research is mainly based on high-resolution mass spectrometry (HRMS) and chromatography, applied to targeted and non-targeted analysis of pesticide residues, metabolites, co-formulants, bioactive compounds, and emerging contaminants in agri-food matrices, contributing to food safety and environmental protection.

She has participated in international collaborations with universities in Chile, Portugal (Porto), and Brazil (Santa Maria), and in several research projects and contracts. She is part of the international network "Food authenticity" and the EU Cost Action CA21149. In 2023-2024 she has led three competitive projects at UAL as principal investigator. One of them, "IAPeak", is a transfer project with Lead Molecular SL, focused on new algorithms and applications in pesticide and drug discovery, the development of the software "Masschemsite", and the implementation of artificial intelligence (AI) in chemical analysis. The other two "Lanzadera" projects open a new research line on the impact of contaminants on human health through biomonitoring studies. She has also collaborated with an agri-food laboratory (LAB SLU, Tentamus Group) in the development of complex analytical methods, and with Thermo Scientific as software specialist and beta tester of Compound Discoverer.

She is also active in outreach and leadership, organizing events such as "Coffee with Science", "European Night of Researchers", and "Women in Science", and publishing dissemination articles in regional newspapers. She has co-authored 60 conference contributions (18 oral, eight at international conferences). In the academic field, she has co-supervised 10 master's theses, 8 undergraduate projects, and 3 doctoral theses (defenses expected in 2026-2027), has taught over 200 hours, and has served on several evaluation committees. She received a positive ANECA evaluation for Tenure-track Assistant Professor in 2022 and a research evaluation (sexenio) in 2025. She supervises visiting international researchers in chromatography and HRMS and has completed seven research stays (two predoctoral, five postdoctoral), contributing to projects such as clabel+ and DIETxPOSOME. Through her international network, leadership in applied research, and scientific output, she is establishing herself as a leading researcher in analytical chemistry applied to agri-food systems.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: SÁEZ SANDINO, TADEO
Referencia: RYC2025-056627-I
Correo Electrónico: tadeosaez@gmail.com
Título: Carbono del suelo, microbioma y sostenibilidad bajo escenarios de cambio global
Resumen de la Memoria:

Mi trayectoria investigadora se articula en tres líneas principales:

(i) Ciclo del carbono y cambio global.

Mis trabajos han demostrado cómo el incremento del número de factores de cambio global reduce las reservas de carbono y sus mecanismos de persistencia a escala mundial. También he aportado evidencia de que una gran fracción de los microorganismos del suelo es altamente sensible al calentamiento prolongado, lo que puede desencadenar cambios en la composición microbiana con efectos directos sobre las funciones críticas que sustentan los suelos. Adicionalmente, he mostrado que ciertos componentes del microbioma como la biomasa microbiana y la abundancia de taxones bacterianos actúan como reguladores de las emisiones de CO₂ del suelo, proporcionando un marco conceptual que ayuda a integrar la dimensión microbiana en modelos globales del ciclo del carbono.

(ii) Patrones ecosistémicos globales.

Mediante enfoques innovadores he contribuido a anticipar la respuesta de múltiples servicios ecosistémicos a escala global. Por ejemplo, caractericé por primera vez la diversidad molecular de la materia orgánica del suelo utilizando espectroscopía infrarroja, demostrando que la huella de la vegetación puede reducir dicha diversidad funcional de la materia orgánica a lo largo de millones de años de desarrollo ecosistémico. Asimismo, a partir de síntesis meta-analíticas basadas en gradientes globales, he mostrado que incrementos relativamente pequeños en la temperatura pueden inducir umbrales abruptos en biodiversidad, funcionalidad del suelo y provisión de servicios ecosistémicos en ecosistemas montañosos, destacando su elevada vulnerabilidad frente al calentamiento climático.

(iii) Recuperación de suelos agrícolas degradados y zonas áridas.

En mi tercera línea aplico enfoques microbianos y herramientas espaciales para mejorar la salud del suelo y apoyar la toma de decisiones en sistemas agrícolas y zonas áridas. He propuesto el uso de consorcios microbianos y biomarcadores funcionales como herramientas capaces de incrementar la materia orgánica, la estabilidad estructural y la capacidad del suelo para sostener procesos clave en contextos de degradación. Asimismo, he contribuido a desarrollar métodos para estimar la presión global del pastoreo en tierras secas, proporcionando un marco para evaluar impactos sobre la productividad y la conservación. Finalmente, he participado en estudios que caracterizan la distribución de patógenos transmitidos por el suelo y su interacción con el microbioma, generando información esencial para el manejo integrado de enfermedades y la mejora de la resiliencia agrícola.

Estas líneas comparten un objetivo común: comprender cómo los servicios ecosistémicos y el microbioma del suelo responden al cambio global y cómo esta información puede emplearse para mejorar la gestión de ecosistemas naturales y agrícolas.

Resumen del Currículum Vitae:

Tras finalizar mi doctorado en la Universidad Pablo de Olavide, me incorporé como investigador posdoctoral a la Western Sydney University (Australia), donde continué desarrollando líneas de trabajo sobre microbioma del suelo mediante metagenómica y experimentos agrícolas manipulativos. He publicado 28 artículos científicos, incluidos trabajos como autor de correspondencia en Nature Climate Change (dos veces) y Global Change Biology. Uno de estos artículos ha sido reconocido por Web of Science como Highly Cited Paper, situándose desde julio/agosto de 2025 entre el 1 % más citado en el área de Environment/Ecology. Mis competencias en modelización espacial e integración de imágenes satelitales han facilitado colaboraciones internacionales que han derivado en publicaciones en revistas como Nature Geoscience, Nature Ecology & Evolution, y Nature Food.

Mi labor de divulgación ha tenido una notable repercusión mediática, con alt métricas destacadas (Altmetric 701) y cobertura en medios como La Sexta, La Vanguardia o Diario Sur. Además, la plataforma científica The Conversation ha publicado artículos que sintetizan mis principales resultados. Mis trabajos como autor de correspondencia fueron seleccionados para Research Briefings y para la sección Behind the Paper por Springer Nature, reforzando su impacto más allá del ámbito académico. Asimismo, he presentado mis investigaciones en congresos nacionales e internacionales y mi producción científica es íntegramente de acceso abierto.

Mi trayectoria incluye estancias predoctorales en Portugal y Estados Unidos, además de mi etapa posdoctoral en Australia, lo que ha propiciado una red activa de colaboraciones con investigadores de referencia internacional. Actualmente colaboro con 237 coautores de 34 países y lidero manuscritos dentro de iniciativas globales como CLIMIFUN o la Crop Microbiome Survey, basada en 900 muestras de cultivos de todo el mundo. Mi independencia científica se refleja en mi participación como investigador principal y coinvestigador en proyectos competitivos. Desde 2025 soy co-IP del proyecto "An integrated disease management program for the Australian Potato Industry" (845.000 €) y IP del proyecto MICROMINER a nivel nacional. También he participado como investigador contratado en proyectos internacionales (358.000 €) y nacionales (324.300 €). En conjunto, mis aportaciones han contribuido a captar más de 1,5 millones de euros en financiación.

Mi compromiso con la formación se plasma en 240 horas de docencia en la Universidad Pablo de Olavide, la supervisión de dos Trabajos Fin de Máster, la cosupervisión de una doctoranda en la Western Sydney University y la tutorización de una investigadora posdoctoral de la Chinese Academy of



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Sciences. También he participado como docente en la Soil Biology Masterclass (2024-2025), orientada a promover técnicas sostenibles para agricultores australianos. He actuado como evaluador en la convocatoria internacional PROPOLAR y como revisor en revistas de alto impacto.

Mi trabajo ha sido reconocido mediante el Premio Extraordinario de Doctorado (UPO, 2025), el programa "Sevilla también es Ciencia Joven 2023" otorgado por el Ayuntamiento de Sevilla y mi selección entre los mejores jóvenes investigadores por la Western Sydney University. Asimismo, obtuve la beca "Theo Murphy Initiative" de la Australian Academy of Science (2024).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: GIRON HERNANDEZ, LUNIER JOEL
Referencia: RYC2025-057004-I
Correo Electrónico: ljgironh@gmail.com
Título: Advanced functional products and bioactive systems that promote well-being through nutrition

Resumen de la Memoria:

My career has developed at the intersection of food biotechnology, materials science, nanotechnology, functional evaluation and tissue engineering. After completing my PhD and a brief family-related career break, I built an international trajectory across Colombia, the UK and Spain. Within this path, my research interests focus on advanced functional products that interact more favorably with the human body and on upcycling food-related waste streams into bioactive components with therapeutic potential.

Between 2016 and 2022 at Universidad Surcolombiana (USCO, Colombia), I established my independence by leading nationally funded consortia on product design, quality assessment and mitigation of neoformed contaminants in cocoa and coffee chains. Working directly with producers revealed the scale of agro-industrial biomass and motivated my line on converting post-harvest residues into biopolymers and phenolic-rich extracts with technological and therapeutic applications. This period strengthened my background in analytical chemistry, biopolymer extraction and biomaterial functionality. In 2022 I joined Northumbria University (UK), expanding my expertise to microbiology, metabolomics, advanced microscopy and biopolymer surface functionalization. I applied waste-derived biopolymers to biomedical contexts, developing antioxidant and anti-inflammatory systems and functional nanoparticles. These activities consolidated my interest in gut physiology and Functional Gastrointestinal Disorders (FGIDs), supported by early work on probiotics, garlic extracts and host-microbe interactions.

In 2025, with the support of a Marie Skłodowska-Curie Postdoctoral Fellowship, I joined UPV to develop smart delivery systems for intestinal health. This fellowship has allowed me to deepen my expertise in *in vitro* cell culture, tissue engineering and controlled-release technologies. I am currently engineering multifunctional microgels capable of sequentially releasing probiotics and phenolics to attenuate gut inflammation. This work integrates biopolymer engineering, nanostructured coatings and advanced biological evaluation.

Building on this foundation, my proposed RYC research line aims to develop multimodal nanosystems combining pre- and postbiotics with miRNA-based therapeutics and antioxidants. These will be co-loaded into stable nanoscale carriers that protect sensitive payloads during gastrointestinal transit and enable targeted release in the intestine, particularly the colon, which is central in FGIDs. A central objective is to evaluate these systems in physiologically relevant 3D intestinal models that I will establish, integrating epithelial and vascular layers and, later, controlled flow in dual-compartment bioreactors. These models will mimic the gut shear stress and barrier dynamics under healthy and FGID-like conditions, enabling realistic assessment of therapeutic performance. In parallel, I will analyze how food processing and heat treatments affect the stability and efficacy of encapsulated compounds, ensuring their translational feasibility. Overall, this research will advance next-generation food-gut-health interfaces and contribute to innovative therapeutic strategies for the management of FGIDs, while positioning bioactive delivery systems at the frontier between food technology, biomaterials and digestive health.

Resumen del Currículum Vitae:

I hold a BSc in Agricultural Engineering in 2005 by Universidad Nacional (UNAL, Colombia), two MSc degrees in Food Science and Engineering (2009) and Management and Food Safety (2010), and a PhD in Food Science, Technology and Management (2014; European mention) at Universitat Politècnica de València (UPV). After a career break to care for my ill father until early 2016, I resumed my research trajectory at international institutions, including Universidad Surcolombiana (USCO, Colombia) and Northumbria University (UK). In 2025, I was awarded a Marie Skłodowska-Curie Postdoctoral Fellowship (MSCA-PF) and joined the CBIT group at UPV.

My research explores advanced functional products that promote well-being through nutrition. This interdisciplinary line has evolved from improved food design and quality assessment to biowaste valorization and biomaterials engineered to address specific physiological needs. It integrates materials science, food biotechnology, nanotechnology, functional evaluation, microbiology and tissue engineering. Given Colombia's agricultural-livestock context, I have contributed to product diversification in the fishing sector, supervising my first PhD student (Quintana S.). I have also advanced the valorization of coffee and cocoa chains by reducing roasting-derived neoformed contaminants and converting post-harvest residues into antioxidants and biopolymers with biomedical potential.

Since 2022, I have broadened my expertise in metabolomics, advanced microscopy, microbiology, and *in vitro* cell culture, strengthening my capacity to functionally evaluate nutrition- and health-oriented biomaterials. Within my MSCA-PF, I am developing controlled-release microsystems delivering probiotics and tannic acid for gut inflammation management.

My scientific leadership spans eight competitive research and knowledge-transfer projects involving academic, industrial and stakeholder partners. These include the MSCA-PF, two large MinCiencias projects in Colombia (~€750k each), and UK Research Councils-funded, industry-linked initiatives. Highlights include: (i) a NERC circular-economy project valorizing cocoa pod husk, where we produced biopolymer-based LbL nanoparticles with enhanced biocompatibility and antioxidant capacity, and (ii) a BBSRC project with Biomara Ltd using algae-derived materials to modulate starch digestibility, later expanded to Amazonian fruit extracts.

My output comprises 42 JCR publications (h-index 13; ~765 Scopus citations), ~74% in Q1 journals, and participation in >30 international conferences, including 6 invited talks. I am committed to dissemination (e.g., booklets on cacao/coffee value chains, a SciPod episode on chocolate's environmental impact) outreach activities, and collaborations with companies such as Biomara Ltd, Boston Nutraceutical S.L. and Cellex Srl.

I have supervised 3 completed PhD theses (+2 ongoing), 3 postdoctoral researchers, 2 MSc students at UPV, and >50 BSc/MSc theses at USCO and Newcastle University. I have facilitated cross-border secondments (3 PhD, 9 MSc) supported by Erasmus+, UK Royal Society and MinCiencias, which have yielded joint publications and strengthened international networks. I serve as editor for Rev Nutr Hum Diet and guest editor for Food Hydrocoll Health and Adv Technol Med, reviewer for JCR journals, and evaluator for MinCiencias, UKRI and the EU Science Foundation.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: PELÁEZ VICO, M ÁNGELES
Referencia: RYC2025-054597-I
Correo Electrónico: mpelaezvico@hotmail.com
Título: Towards resilient agroecosystems: Plant-to-plant communication and multiscale stress biology
Resumen de la Memoria:

To date, my scientific career has advanced the field of plant stress biology across multiple scales: from the cellular and molecular level (peroxisomal regulation, stomatal dynamics, whole tissue and single cell transcriptomic responses) to the organism level (systemic signaling, stress combination, hormonal regulation, reproductive responses to stress), and further to interspecies interactions within ecologically/agriculturally relevant conditions (symbiosis, plant-plant communication, field studies). Building on these foundations, I aim to develop a more comprehensive understanding of plant-environment interactions as a basis for developing resilient crops and plant communities capable of overcoming the environmental challenges we face.

I recently discovered that plants that grow together and physically touch each other establish an aboveground community-wide signaling network that enhances their collective resilience to stress. If awarded, in the new stage of my career, I will further determine the type of signals (chemical signals, physical interactions) that plants exchange when exposed to more than one stress (multifactorial stress combination, MFSC) with the goal of discovering whether these signals can be harnessed to enhance the resilience of the entire plant community to stress combination.

The main objective of my proposed project, "Plant-to-plant communication as a tool to enhance resilience to stress combination", is to determine the mechanisms and the type of signals that plants use to communicate with each other under stress combination conditions, with the broader vision of de novo designing resilient agroecosystems that will be tolerant to climate change.

Resumen del Currículum Vitae:

My career has advanced plant stress biology in three major areas:

Multifactorial stress combination (MFSC): Demonstrated that MFSC, rather than single stresses, drives reproductive damage and yield loss in crops (soybean, maize, rice), aligning experimental design in the laboratory with agroecosystems under climate change.

Systemic and cell-to-cell signaling: Provided the first evidence of rapid cell-to-cell signaling under waterlogging and identified key molecular components of this response.

Plant-to-plant communication: Demonstrated that physical contact between plants enables exchange of electrical, calcium, and reactive oxygen species signals, enhancing community-wide resilience to excess light stress. This pioneering line highlights inter-plant signaling as a tool to design resilient plant communities.

I have disseminated these findings through 32 peer-reviewed publications (4 under review), many in top 10-25% journals, with ~900 citations in the past 5 years and an H-index of 17. As first/second author in 23 papers, I have played a leading role in knowledge dissemination. I co-organized and moderated an international symposium at ICAR2024, participated in 20 conferences/workshops, and contributed to 9 projects and 2 networks over the last decade, collaborating with >20 groups across 6 countries. I have secured funding in Spain and the USA, consolidating my leadership in plant stress biology.

-Contributions to society: My work addresses climate change challenges in agriculture and food security. I am currently involved in developing soybean tolerant to drought-heat stress in Prof. Mittler's lab, a project featured in media across eight countries. I also raise awareness of the climate crisis through associations (Latino/a Graduate & Professional Network) and outreach activities (Career Exploration Field Day).

-Training and career development: Mentorship is central to my philosophy. I have supervised 8 undergraduate/MSc students (Spain and USA), served as external evaluator in one thesis, and engaged in academic networks (Latino/a Graduate & Professional Network, ASPB). I regularly serve as a reviewer for leading journals, contributing to high research standards.

-Science outreach and communication: I actively engage with diverse audiences in Spain and the USA (European Researchers' Night, Science on Wheels). My scientific illustrations have appeared on journal covers and won recognition in art-science competitions, integrating creativity with communication.

Overall, my research stands out for originality, impact, and global relevance, with clear potential to improve crop resilience and secure food production under climate change, underscoring my commitment to advancing plant science through innovative and impactful research.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: CONESA SAURA, MARÍA DEL ROSARIO
Referencia: RYC2025-056796-I
Correo Electrónico: charoconesasaura@gmail.com
Título: Uso sostenible del agua en la agricultura

Resumen de la Memoria:

La trayectoria de la Dra. M. R. Conesa se ha forjado en un escenario marcado por la creciente escasez de agua, un desafío que afecta de manera crítica a la agricultura europea y, especialmente, a España. Desde sus inicios en 2008, comprendió que el futuro de los sistemas agrícolas dependía de una gestión del agua más precisa, resiliente y tecnológicamente avanzada. Esta convicción ha guiado una carrera dedicada a reducir la huella hídrica mediante estrategias de riego de precisión, sensores innovadores y prácticas culturales que permitan sostener la productividad en un clima cada vez más restrictivo.

Su formación en Ingeniería Agronómica y el Máster en Gestión del Riego sentaron las bases de una especialización que se consolidó durante su doctorado, financiado por un contrato FPU. Allí estudió cómo las plantas responden al déficit hídrico y cómo dichas respuestas pueden transformarse en herramientas para programar el riego con menor incertidumbre. Sus resultados, reconocidos con el Premio Extraordinario Internacional de Doctorado y el Accésit I-AgroBank, mostraron que el riego deficitario controlado podía integrarse de manera fiable en cultivos leñosos mediterráneos.

Tras su etapa en el proyecto LIFE IRRIMAN y en la Cátedra FMC-UPCT, donde trabajó estrechamente con técnicos y agricultores, amplió su experiencia en la empresa privada como Responsable de I+D, fortaleciendo su capacidad de trasladar la ciencia al sector productivo. Su incorporación al CEBAS-CSIC, respaldada por dos contratos Juan de la Cierva, le permitió construir una línea propia centrada en el uso combinado de sensores de suelo y planta para avanzar hacia un riego autónomo basado en datos reales.

La doctora ha demostrado la eficacia del manejo del riego a partir del MAD, especialmente en frutales y cítricos, y ha profundizado en el potencial de los llamados biosensores de planta, capaces de monitorizar en tiempo real el estado hídrico del cultivo. Su propuesta científica actual busca integrar estos sensores [microtensiómetros de tronco, TDR de tronco y termoradiómetros] en sistemas de apoyo a la decisión (DSS) que automaticen la programación del riego. Asimismo, incorpora prácticas culturales como mallas de sombreado y coberturas vegetales, y complementa su enfoque con sensores ópticos proximales, línea reforzada durante su reciente estancia José Castillejo en Italia.

Con 45 publicaciones indexadas (71% Q1), 818 citas, un índice H de 18, 116 contribuciones científicas, 14 proyectos (4 como IP) y un papel activo en edición, consultoría y divulgación, la Dra. Conesa ha construido una trayectoria coherente: transformar el conocimiento fisiológico y agronómico en herramientas reales para agricultores y técnicos. Su investigación aspira a establecer protocolos universales de riego autónomo, alineados con el Pacto Verde Europeo y con la digitalización del ciclo del agua, contribuyendo a la sostenibilidad de los agroecosistemas mediterráneos.

Resumen del Currículum Vitae:

La Dra. M. R. Conesa es Personal Técnico de Investigación (Grupo M2) en el Departamento de Agua y Producción Vegetal de CEBAS-CSIC, tras superar el proceso institucional de estabilización mediante concurso-oposición. Acumula 17 años de experiencia en riego sostenible, especializada en programación precisa del riego en condiciones de escasez hídrica, estrategias de riego deficitario controlado y uso de biosensores y prácticas culturales para mejorar la eficiencia en el uso del agua.

Inició su trayectoria en 2008 en la UPCT, donde obtuvo el título de Ingeniera Agrónoma y el Máster en Gestión del Riego (2009). En 2010 se incorporó al Departamento de Producción Vegetal (UPCT) con un contrato FPU, realizando su doctorado (defendido en 2016 con calificación de Sobresaliente Cum Laude) y recibiendo el Premio Extraordinario Internacional de Doctorado y el Accésit del Premio I-AgroBank.

Entre 2015 y 2016 trabajó en el proyecto europeo LIFE IRRIMAN y en la Cátedra FMC Agricultural Solutions-UPCT, donde actuó como Coordinadora Técnica. Posteriormente adquirió experiencia industrial como Responsable de I+D y Calidad. En 2018 se incorporó al CEBAS-CSIC con una Juan de la Cierva-Formación, seguida de una Juan de la Cierva-Incorporación.

Ha participado en 14 proyectos (3 internacionales, 7 nacionales y 4 regionales), siendo IP en 4, y colaborado en contratos de investigación y MTAs. Realizó estancias en la Universidad de Lancaster (Reino Unido) y en CREA-OF (Italia). Posee la venia docendi (2013), ha dirigido 4 TFM, co-dirigido 1 tesis doctoral y formado alumnado en el Programa IDIES (2019-2025). Es miembro del Comité Organizador del Congreso Ibérico de Biología Vegetal 2025.

La Dra. Conesa es coautora de 45 publicaciones indexadas, incluyendo 35 artículos científicos, de los cuales 71% son Q1 y 37% D1 (JCR 2025). Es primera o autora de correspondencia en el 70% de ellos. Su producción ha recibido 818 citas, con índice H de 18 (Scopus, 2025). En total, suma 116 contribuciones científicas entre artículos, capítulos, comunicaciones y trabajos técnicos.

Es Editora Asociada de Frontiers in Plant Science y Editora de Temas en ocho revistas MDPI. Ha actuado como consultora externa para KU Leuven, ANID (Chile) y ANII (Uruguay), así como evaluadora de tesis doctorales. Revisa artículos para revistas de alto impacto (Agric. Water Manag., Sci. Hortic., Irrig. Sci., entre otras). Es miembro de la SEBP, FESPB y la EGU, y participa activamente en labores de divulgación.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Ha recibido cinco contratos competitivos (José Castillejo, JdC-Incorporación, JdC-Formación, FPU Estancia Corta, FPU Predoctoral) y figuró en la lista de reserva de las convocatorias Ramón y Cajal 2023 y 2024. Esta es la última convocatoria para la que cumple los requisitos según su fecha de defensa de tesis.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: AZPIAZU SEGOVIA, CELESTE
Referencia: RYC2025-057238-I
Correo Electrónico: azpiazu.celeste@gmail.com
Título: Ecotoxicology and conservation of pollinators in agroecosystems

Resumen de la Memoria:

PhD in Agro-Environmental Technology for Sustainable Agriculture, with International Mention, from the Technical University of Madrid (UPM). My research focuses on pollinator conservation and pollination services in agroecosystems. I have published 28 papers, 19 of them indexed (15 JCR Q1, 2 JCR Q2, 1 SJR Q4, and 1 in other databases), and presented 17 oral communications and 3 posters at national and international conferences. I have participated in 4 national R&D&I projects, 1 competitive regional project, 1 international Art. 83 project at the University of Bologna (UNIBO, Italy), and 1 national Art. 83 project at UPM. My work centers on the ecotoxicology of solitary bees (*Osmia* spp.), conducting field, semi-field, and laboratory experiments. In my most relevant publication (DOI: 10.1038/s41598-019-50255-4), I demonstrate major limitations of current pesticide risk-assessment schemes, including the omission of solitary bees. As a result, I am part of the APITOX Task Force (COLOSS), where I coordinate and lead an interlaboratory experiment involving 14 international laboratories to develop a standardized chronic exposure protocol for solitary bees. This protocol is currently under OECD evaluation for adoption as an official Test Guideline. I am also a member of the OECD Test Guidelines Programme's Scientific Expert Group on Bees. I completed several international predoctoral research stays, including an Erasmus scholarship in Sweden (5 months), a Magallanes scholarship in Chile (5 months), and two stays at UNIBO (6 months). After my PhD, I spent 19 months as a postdoctoral researcher at UNIBO. In Spain, I have collaborated with the Institute of Agricultural Sciences (ICA-CSIC) during my Master's thesis and with the School of Agricultural, Food and Biosystems Engineering (ETSIAAB-UPM) during my PhD. I worked for one year as a postdoctoral researcher at the Center for Ecological Research and Forestry Applications (CREAF). Thanks to the Margarita Salas Fellowship, I worked for two years at the Institute of Evolutionary Biology (CSIC-UPF) and one year at the Autonomous University of Barcelona (UAB). During this period, my work focused on the molecular effects of pesticides on solitary bees and on assessing the combined impacts of multiple stressors, including pesticide exposure, nutritional stress, and climate-related factors. I am currently working at the Madrid Institute for Rural, Agricultural and Food Research and Development (IMIDRA), where I am Principal Investigator of one project (FEGA, 2023-2026) and a member of the research team of one international project (G04ALL) and two IMIDRA-funded projects. My work focuses on evaluating beekeeping sustainability and its interactions with wild pollinators.

Resumen del Currículum Vitae:

The applicant is an ecologist specializing in pollinators, agroecosystem sustainability, and ecotoxicology, with research strongly aligned with SDG2030. Her work focuses on (1) pollinator conservation and pollination services in agricultural landscapes, (2) the behavioural, physiological, and molecular impacts of agrochemicals and environmental stressors on bees, and (3) improving pesticide risk-assessment frameworks to better protect non-managed pollinators. Her overarching goal is to advance sustainable agricultural practices that preserve biodiversity and secure pollination services under global-change scenarios. She has published 19 indexed articles (7 first-author; 4 D1, 10 Q1, 3 Q2, 1 Q4; plus 1 additional JCR-indexed), with 318 citations (Scopus), 209 (WoS) and 432 (GS) and H-indices of 10/8/11. She has presented 17 conference contributions (15 oral; 10 international; 7 as first author). She has participated in 12 research projects: PI of 2, member of 4, and participant in 6, including 1 HORIZON project, 5 national AIE projects, 3 competitive regional projects, and 2 Art. 83 industry/NGO contracts (Syngenta-UPM; Pollinis-UNIBO). Her competitive funding track includes a Margarita Salas Postdoctoral Fellowship (UPM, 2021-2023, at IBE-CSIC/UPF and UAB), two predoctoral mobility grants (Ghent University and UNIBO), an FPI fellowship (UPM), and international scholarships in Chile (PUC) and Sweden (SLU). The applicant has demonstrated strong leadership and international engagement. She coordinates a large-scale interlaboratory experiment within APITOX-COLOSS, involving 14 international labs, to develop an OECD-standard protocol for chronic pesticide exposure in solitary bees—currently under evaluation by the OECD. She is also a Scientific Expert in the OECD Test Guidelines Programme (Bee Expert Group). She has co-authored papers with over 40 international collaborators, including extensive cooperation with Italian teams during her UNIBO stay and postdoctoral period. Her contributions to society include collaboration with industry and NGOs, participation in OECD-related regulatory activities, and involvement in ecotoxicology protocol validation with pesticide companies and ecotox labs. She has produced 8 outreach publications and participated in 10 professional dissemination events, and organized a scientific workshop at UAB (2025). She has co-supervised 1 BSc and 5 MSc theses (UAB, UNIBO, UPM), supervised internships at CREAF, and trained five PhD students across UNIBO and CREAF-UAB programs. Her teaching experience includes 76 hours in official courses at UPM and UAB, plus seminars and outreach workshops at UNIBO. She has participated in two PhD committees, evaluated IMIDRA-LEADER R&D projects, and reviewed manuscripts for eight SCI journals. She is a member of SEEA and COLOSS, and holds a positive ANECA evaluation for Contratada Doctora (2023).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: MUÑIZ PUMARES, DANIEL
Referencia: RYC2025-054445-I
Correo Electrónico: dmunip@gmail.com
Título: Exercise Physiology - from health to performance

Resumen de la Memoria:

My career trajectory spans institutions in the UK, including the University of Greenwich, St Mary's University, and the University of Hertfordshire, alongside ERASMUS+ placements at INEFC Barcelona (Spain) and the Karolinska Institutet (Sweden). I have over 15 years of experience working in Higher Education Institution outside of Spain. This extensive exposure has fostered a strong international network of collaborators from the US, Australia, New Zealand, and Europe.

I am currently based at the University of Hertfordshire (UK), where I am a member of the Centre for Research in Psychology and Sport, where I have established myself as an independent researcher. My work revolves primarily around two lines of research.

Exercise for Health ☐ Focused on optimizing exercise interventions to improve quantifiable health markers. This includes systematic approaches to reduce variability in health outcomes, particularly through the prescription of exercise intensity relative to physiological thresholds.

Exercise Performance ☐ Aimed at exploring the limits of endurance performance, with applications to both elite athletes and recreational exercisers. I have introduced novel approaches, such as durability metrics and non-linear models, for assessing performance variability.

I have published over 40 research outputs, attracting around 800 citations (Google Scholar). Further, my work on this area has been highlighted by leading journals, commended in editorials, and earned Altmetric scores exceeding 1100, and featured in over 150 news outlets worldwide.

My projects, both research and commercial, have attracted around ~£200,000 worth of investing and income generation.

I have substantial experience mentoring younger academics. I have guided PhD and MSc students to academic success. I was also selected as a mentor in the IMFAHE program, reflecting my commitment to supporting emerging researchers.

My research demonstrates diverse methodological approaches, including small-scale laboratory studies, randomized controlled trials, and big-data analyses involving over 120,000 participants. I have also experience conducting standard meta-analysis, and meta-analysis with individual participant data. I also have experience conducting data collection in the laboratory-based, the field, and remote studies, often have collaborated with the industry to access large datasets. I have overseen and led large, interdisciplinary and international projects to success, from conceptualization through to dissemination.

If awarded a Ramón y Cajal Fellowship, I plan to expand research in two key areas. First, I would like to expand on our work addressing the role of exercise prescription at reducing response variability to exercise programmes. Specifically, I would like to continue with our promising results, demonstrating individualised exercise interventions can increase response rates from ~16 to 64% (e.g. doi: 10.1007/s40279-024-02125-x). Second, I aim to continue our work on endurance performance, exploring durability as a novel marker for endurance performance, and factors that contribute to success in athletes of all levels, due to its popularity with end users and potential translation to health (e.g. doi: 10.1007/s40279-024-02137-7).

Resumen del Currículum Vitae:

I am an experienced, all-round academic currently serving as Senior Lecturer in Exercise Physiology and Team Lead at the University of Hertfordshire. I have been a Fellow of the Higher Education Academy since 2015, and have over a decade of experience at internationally recognised research institutions, with a robust research portfolio characterised by interdisciplinary collaboration and diverse methodologies. My academic journey includes positions at the University of Greenwich, St Mary's University, and the University of Hertfordshire, as well as ERASMUS+ placements at INEFC Barcelona (Spain) and the Karolinska Institutet (Sweden). This international exposure has enabled me to build a strong network of collaborators across the US, Australia, New Zealand, and Europe.

My research focuses on two primary lines. I have investigated around exercise for health. Aimed at optimising exercise interventions to improve measurable health markers. This includes systematic approaches to minimize variability in health outcomes, particularly through exercise intensity prescription based on physiological thresholds. I also have worked around exercise Performance, with the goal of understanding the limits of endurance performance for both elite athletes and recreational exercisers.

I have published over 40 research outputs, with an h-index of 14 and ~800 citations (Google Scholar). My work has been recognised by featured journals, commended in editorials, received monetary prizes, and garnered significant online attention, earning Altmetric scores exceeding 1000. Beyond publishing, I have mentored PhD and MSc students to academic success. My commitment to mentorship is further reflected in my role with the IMFAHE program, where I support emerging researchers globally.

If awarded a Ramón y Cajal Fellowship, I aim to expand my research in two key areas I currently work on. First, reducing response variability ☐ Designing effective exercise interventions to address variability in individual responses and minimize the prevalence of "non-responders" to exercise. Second,



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

exploring human performance? Investigating the boundaries of endurance performance in both elite athletes and recreational exercisers, with a focus on durability as a novel marker for endurance capacity.

My methodological expertise spans laboratory-based studies, randomized controlled trials, big-data analyses involving over 120,000 participants, and meta-analyses of individual participant data. These contributions extend across laboratory, field, and remote study designs, often leveraging industry collaborations for access to large datasets. As a senior author on many projects, I oversee all phases of research, from conceptualization to dissemination.

My contributions to academia have been highlighted in VOLVER: Historias de talento expatriado, a book that showcases the experiences of successful Spanish academics abroad. A perfect example that aligns with the goals of the Ramón y Cajal Fellowship programme!



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: AVELLO MARTÍNEZ, RAIDELL
Referencia: RYC2025-054655-I
Correo Electrónico: raidell.avello@udc.es
Título: Explainable Artificial Intelligence for Transforming Education
Resumen de la Memoria:

My research trajectory is situated at the intersection of Educational Technology and Artificial Intelligence, evolving from digital literacy and educational robotics toward advanced AI applications for learning. Since obtaining my PhD in Pedagogical Sciences in 2017, I have consolidated a scientific profile marked by international mobility and the transition from institutional research to independent scientific leadership. At the University of Cienfuegos (Cuba), I founded the Emerging Technologies for Learning Research Group (GITEMA), where I directed projects on computational thinking and developed open-source tools recognized internationally. My career has been strongly shaped by sustained international engagement, including competitive fellowships at the University of Helsinki (Finland, 2019) and a postdoctoral stay at the University of Warsaw (Poland, 2023-2024), where I co-authored studies on AI literacy funded by the Bolivarian University of Ecuador. Currently, I conduct my research at the University of A Coruña (Spain), coordinating key work packages in the Erasmus+ AIM@VET and DIGITAL FIRST projects.

Line of Research to be Developed: My future research line, "Explainable Artificial Intelligence for Transforming Education", addresses the urgent challenges posed by the surge in Generative AI. This line aligns directly with the European Union Regulation on Artificial Intelligence (EU AI Act) and the Digital Education Action Plan 2021-2027, which mandate transparency and human oversight for high-risk educational systems. The primary goal is to bridge the gap between algorithmic technical transparency and pedagogical "understandability".

The research focuses on the epistemic, cognitive, and ethical dimensions of explainability (XAI), exploring how systems can provide "actionable" explanations that strengthen teachers' and learners' decision-making. The specific objectives are: 1. Theoretical Modelling: Develop frameworks integrating algorithmic transparency with cognitive understandability, analyzing how "trust" and "agency" emerge in human-AI interaction. 2. Prototyping: Design and test educational prototypes (explainable tutoring agents and intelligent dashboards) using environments like ProgTutor (a programming tutor developed at UDC) extended with generative AI layers to visualize reasoning processes and uncertainty. 3. Trust & Ethics: Model and measure trust formation, identifying behavioural and emotional mechanisms of explainability. 4. Policy Guidelines: Generate frameworks for responsible AI adoption, co-created with stakeholders.

Methodologically, the project adopts a mixed-methods, Design-Based Research approach organized in three iterative phases: (1) Conceptual modelling through Delphi consultations with experts in AI, pedagogy, and cognitive psychology; (2) Prototype design and empirical validation using Learning Analytics to triangulate quantitative interaction logs with qualitative evidence from classroom pilots; and (3) Open dissemination, ensuring all code and datasets are released under open licences (GPL/CC-BY) via GitHub to ensure reproducibility. This line will consolidate a Human-Centred AI Lab in Education, positioning the host institution as a European reference in ethical educational technologies.

Resumen del Currículum Vitae:

I hold a PhD in Pedagogical Sciences (2017) and specialize in Educational Technology and Artificial Intelligence. My scientific production includes over 60 publications, 30 of which are indexed in Scopus (20.8% in Q1, h-index 9) and have accumulated over 3,576 citations in Google Scholar (h-index 26). My work is distinguished by an interdisciplinary approach, publishing in top-tier journals such as Revista de Educación a Distancia, Frontiers in Education, and Cogent Education.

Leadership in Competitive Projects: I have progressively assumed leadership roles in national and international R&D. Currently, I am a key researcher in two major Erasmus+ projects at the University of A Coruña. In AIM@VET (Budget: €400k), I led the design of the Robotics Module, creating 12 didactic units and integrating RoboDK simulations for vocational training. In DIGITAL FIRST (Budget: €1.4M), I serve as Co-leader of Work Package 6, coordinating the piloting of functionalist informatics curricula across European partner institutions. Previously, as Co-PI of projects funded by the Bolivarian University of Ecuador (\$30k total), I directed research on AI and Data Literacy, managing teams across three institutions and producing policies for teacher training.

Internationalization and Mobility: My career is defined by sustained international mobility. I was awarded the FinCEAL Plus BRIDGES grant for a research visit at the University of Helsinki (2019) and completed a postdoctoral fellowship at the University of Warsaw (2023-2024), where I initiated independent research lines on digital literacy. I have also collaborated with the Tec de Monterrey (Mexico) and served as Invited Professor in Ecuador. These experiences have resulted in over 10 international co-authored papers and a robust network across Europe and Latin America.

Transfer, Innovation, and Open Science: I am deeply committed to Open Science; 85% of my production is open access. I lead the development of open-source tools, most notably Moodle Logs Analytics (GitHub), a web application for learning analytics adopted by 12 departments and 890 educators to monitor student engagement. In the field of educational robotics, I founded scientific interest clubs that won the Silver Medal at the CINTEC Innovation Festival and recognition at the World Scratch Competition.

Service and Recognition: My standing in the community is evidenced by my role as Associate Editor of RED - Revista de Educación a Distancia (Scopus Q2) and as a regular reviewer for Q1 journals like IJTHE and Communicar. I have supervised 12 master's theses and mentored early-career researchers. Furthermore, I have received the Provincial Award for Technological Innovation (CITMA) and the Scientific Merit Award for the impact of my applied research in the Cuban higher education system. I have delivered invited lectures in Spain, Mexico, Ecuador, Peru, and Paraguay, actively disseminating research on ethical AI and digital transformation.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: MENDOZA MUÑOZ, MARIA
Referencia: RYC2025-055329-I
Correo Electrónico: mamendozam@unex.es
Título: Development and International Consolidation of Physical Literacy as an Educational and Health Competence Across the Lifespan

Resumen de la Memoria:

The candidate's research trajectory is defined by the systematic development of a rigorous and pioneering line of investigation on physical literacy (PL) in Spain. Her work has focused on establishing PL as a measurable, educational, and health-related construct, generating tools, evidence, and theoretical frameworks that have shaped the field nationally and contributed significantly at the international level. She has led the adaptation and validation of the CAPL-2 for Spanish schoolchildren, produced the first empirical data on PL levels in Spain, and developed the first Spanish assessment battery for PL (SPLA-C), now recognised as a national reference for research and educational evaluation. Her contributions also include the validation of the PPLI-Sp for adults, the first Spanish-language instrument for assessing perceived PL in this population. Together, these works have positioned PL as a key determinant of health and educational engagement, linking it with body composition, obesity, motivation, pedagogical practices, and well-being.

Her trajectory integrates psychometrics, public health, and educational theory, enabling the consolidation of a coherent research programme that addresses PL from childhood through adulthood. Internationally, she has strengthened this line through leadership roles in the Active Healthy Kids Global Alliance (Global Matrix 4.0 and 5.0), participation in EUROPLIT, and collaborations with leading researchers from Europe, Canada, Asia, and Latin America. These partnerships have resulted in highly cited publications, validated tools, curricular analyses, and cross-national comparisons that reinforce the scientific and societal relevance of PL. Her work has also included the first intervention studies on PL carried out in Spain, demonstrating her ability to transfer conceptual models into educational and health-promotion practice.

Across this trajectory, the candidate has shown strong methodological expertise, leadership in multidisciplinary teams, and the capacity to obtain competitive funding. The coherence and productivity of her work reflect a research line already mature, internationally recognised, and capable of generating impact in educational, scientific, and social domains.

Building on this consolidated foundation, the proposed project introduces a new and innovative direction: extending her established research line into the digital, scalable, and cross-cultural evaluation of adult physical literacy, an almost unexplored area worldwide. This next step aims to create digital self-assessment systems, personalised feedback mechanisms, and evidence-based educational interventions that will expand the reach of PL research and position adult PL as a key component of lifelong learning, active living, and health promotion.

Resumen del Currículum Vitae:

The documents provides a comprehensive and quantitative overview of the candidate's scientific trajectory, demonstrating a consolidated and internationally oriented research profile. It highlights more than seven years of full-time research experience, an international PhD, two master's degrees, and her current postdoctoral position at Universidad Loyola Andalucía, following previous roles as lecturer and researcher at the University of Extremadura.

Her scientific production includes over than 98 publications indexed in Web of Science (h-index = 14), with 16% as first author, 18% as last author, and 23% as corresponding author, more than 30 conference contributions, and the development of three pioneering instruments for assessing physical literacy (PL): the Spanish adaptation of CAPL-2, the SPLA-C battery for schoolchildren, and the PPLI-Sp for adults. These outputs establish her as one of the leading researchers in PL evaluation in Spain and a relevant contributor internationally.

She has participated in over 15 competitive projects, including two prestigious postdoctoral contracts exceeding €250,000 in total, three regional projects on therapeutic active tourism, two Erasmus+ initiatives on active lifestyles and rural development, and national research supported by the Women's Institute. Her international projection is reinforced by active participation in the Active Healthy Kids Global Alliance, where she led the Extremadura Report Card for Global Matrix 4.0 and 5.0, involving more than 60 countries, as well as her role in EUROPLIT, contributing to the first European-wide analysis of PL in policy, practice, and curricula. These collaborations have resulted in highly cited publications, validated instruments, and cross-national comparative studies, reflecting her capacity to contribute to global scientific dialogue.

Her commitment to training early-stage researchers is evidenced by the co-supervision of four defended doctoral theses, four ongoing doctoral projects, five undergraduate dissertations, and one master's thesis, covering topics such as physical literacy, health-related quality of life, adapted sport, and educational interventions. She has also taken part in more than ten scientific outreach and knowledge-transfer activities, including European Researchers' Night, Circular Science, and the regional programme 'Sport is Health', and she has contributed to public science communication through The Conversation. Her transfer activity includes co-authorship of a registered utility model derived from therapeutic active-tourism projects.

She has served as editor for PLOS ONE and Frontiers, guest editor for eight special issues, reviewer for more than thirty indexed manuscripts, and evaluator of international research projects. Additionally, she has held elected positions in university governance bodies and in the Board of the Association of Young Researchers of Extremadura. Altogether, the document portrays a researcher with strong scientific leadership, competitive capacity, international visibility, and a consolidated research line in physical literacy, health, and education.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: MARÍN JIMÉNEZ, NURIA
Referencia: RYC2025-057291-I
Correo Electrónico: nuriamjimenez@correo.ugr.es
Título: EMPOWHER: Integrating Gender Equity into Exercise Science Research and Education to Improve Women's Health Across the Lifespan

Resumen de la Memoria:

Research Trajectory:

My research trajectory is defined by a sustained commitment to advancing women's health, gender equity and exercise science through rigorous research, methodological innovation and evidence-based educational practice. Across two internationally recognised PhDs, competitive fellowships and leadership roles in national and international projects, my work has addressed critical gaps in how women are represented and supported across life stages—from adolescence to pregnancy, menopause and chronic conditions such as multiple sclerosis. This approach has consistently prioritised translational value and real-world applicability.

A central focus of my career has been the use of physical fitness as a health indicator in women, demonstrated through contributions to FLAMENCO, GESTAFIT and ADULT-FIT. These projects established how tailored exercise interventions improve quality of life, maternal-fetal outcomes and midlife health, while providing validated assessment tools sensitive to sex, age and activity level. My work has also contributed to large-scale fitness datasets and methodological standards, reinforcing the need for sex-specific approaches in exercise science and promoting greater inclusivity.

Building on this trajectory, my current Juan de la Cierva Fellowship deepens my focus on gender-responsive exercise interventions, particularly in women with multiple sclerosis through the EMMA and ADVICE projects, which integrate menstrual-cycle monitoring, behavioural profiling and health education to support more personalised chronic-disease management.

My research also includes strong educational innovation and public engagement. Through initiatives such as Evidencia Sonora, coeducational resources and science communication, I promote scientific literacy and gender equity in exercise and health education, ensuring research findings generate meaningful societal impact and reach diverse communities.

International training and collaborations in Sweden, Canada, Chile, the US and Austria have expanded the conceptual and methodological breadth of my work, reinforcing my ability to lead independent projects and contribute to global women's health research with a multidisciplinary perspective.

Line of Research to Be Developed:

My proposed programme, "EMPOWHER: Integrating Gender Equity into Exercise Science Research and Education to Improve Women's Health Across the Lifespan", integrates exercise science, gender equity, women's health and educational innovation to address long-standing biases in how women are studied and supported. It aims to:

1. Develop gender-sensitive, cycle-informed frameworks for exercise prescription and health assessment.
2. Reduce gender bias in research design and participation.
3. Strengthen women's health and scientific literacy through tailored programmes and digital tools.
4. Generate scalable interventions for adolescence, pregnancy, menopause and chronic disease.

This programme consolidates Spain's leadership in gender-equitable exercise science and leverages my expertise to produce long-term academic and societal impact while fostering international collaboration.

Resumen del Currículum Vitae:

My scientific career focuses on advancing women's health, gender equity and exercise science through rigorous research, interdisciplinary collaboration and educational innovation. I completed two internationally recognised PhDs: one in Health Sciences (2022), centred on fitness assessment tools for adults (ADULT-FIT Project), and another in Biomedicine (2023), investigating maternal-fetal impacts of exercise during pregnancy (GESTAFIT Project). Both received cum laude distinctions, a programme award and an Honorary Mention from the Royal Academy of Doctors of Spain. Supported by a competitive predoctoral fellowship (PPIT-FPI19), these projects established my expertise in health-related fitness and maternal health. As a Juan de la Cierva Fellow (JDC2022-048611-I), I coordinate the ADVICE Project at the University of Almería, developing educational and exercise-based programmes to improve quality of life in women with neurodegenerative diseases. I also contribute to the EMMA Project, analysing physical activity responses across the menstrual cycle.

I am involved in two ongoing research projects on hormonal health: the CICLOS Project, examining menstrual-cycle patterns in active women, and the PERCIVIR Project, investigating hormonal profiles through applied exercise science.

I have authored over 34 peer-reviewed publications (33 in Q1-Q2 journals), with an H-index of 15 and more than 670 citations, serving as first, second or corresponding author in 60% of them. I have presented more than 30 communications at national and international conferences and served on organising committees for major events, including the ISBNPA 2026 Annual Meeting, the II International Congress on Women in Sport Sciences (2025) and the IRONFEMME/NSCA Spain Symposium (2019). I am Guest Editor for two Special Issues and reviewer for multiple indexed journals.

Internationalisation is a key strength of my path. I have completed 10 months of research stays at leading institutions—Karolinska Institute (Sweden), Pontificia Universidad Católica de Valparaíso (Chile) and the University of Alberta (Canada), the latter including the MITACS Globalink Research Award



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

to develop a research project. These stays resulted in high-impact publications, methodological training and a consolidated global network. I also contributed to coeducational initiatives during a volunteer stay in Cusco (Peru).

My leadership extends to supervision and teaching. I supervise (and have supervised) more than 25 undergraduate and postgraduate theses and co-supervise two doctoral dissertations. I authored Coeducación en Movimiento, revised teaching guides to incorporate gender-responsive approaches and lead the educational innovation project Evidencia Sonora, coordinating teachers and students from six universities. I have also taught healthy-ageing courses, contributed to doctoral training schools and led community workshops such as Physical Exercise in Menopause.

I maintain a strong commitment to scientific dissemination through the European Researchers' Night, 3-Minute Thesis, Café con Ciencia and 11F initiatives, as well as through social media (@fitfreak.lab), podcasts and invited webinars for COLEF Andalucía. With the Ramón y Cajal Fellowship, I aim to develop educational and health-promotion programmes addressing women's needs across the lifespan.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: LÓPEZ CARRIL, SAMUEL
Referencia: RYC2025-055873-I
Correo Electrónico: samlopca@gmail.com
Título: Integrating social media in sport management education through active learning to foster students' professional and digital development

Resumen de la Memoria:

My academic and research trajectory focuses on the integration of social media into higher education, with a particular emphasis on sport management education. This work aims to foster students' professional and digital competencies through active teaching-learning methodologies, equipping them with the skills needed to navigate a digitalised professional environment. Over the years, I have led this line of research, collaborating with both national and international colleagues to design innovative projects that address emerging challenges and opportunities in education. These efforts have resulted in high-impact publications, international collaborations, and educational innovations that have enhanced teaching and learning processes.

My research has explored the use of platforms such as LinkedIn, Pinterest, and TikTok, evaluating their pedagogical potential, benefits, and challenges in educational contexts. Among my key contributions are pioneering studies on the use of TikTok for educational purposes and LinkedIn for developing students' professional branding and employability. These studies have been published in top-tier academic journals (JCR Q1), receiving substantial recognition within the academic community. Furthermore, my work has directly informed the design of educational innovation projects and teacher training programmes, amplifying its practical impact.

During the Ramón y Cajal fellowship, I aim to consolidate and expand this research line by developing four innovative sublines that address gaps in the literature and societal needs:

1. Exploring the "dark side" of social media in education: While my previous research has focused on the positive aspects of social media, this subline will investigate risks such as misinformation, addiction, cyberbullying, and distraction. I will also develop evidence-based guidelines to promote responsible social media use among students, educators, families, and institutions.
2. Analysing institutional policies and strategies for integrating SM into higher education: While many educators independently adopt SM tools in their teaching practice, institutional approaches often lack coherence or strategic direction. This subline would explore how universities and education systems across different countries are addressing the integration of SM in their educational models, focusing on digital literacy frameworks, training programmes for faculty, ethical guidelines, and institutional communication strategies. The aim is to identify best practices and provide evidence-based recommendations for policymakers and university leaders seeking to promote meaningful and responsible use of SM in education.
3. Examining the intersection of social media and artificial intelligence (AI): AI has revolutionised education, and its integration with social media opens new avenues for content creation, evaluation, and segmentation. This subline will explore how educators and students can combine these tools to optimise teaching and learning processes.
4. Conducting comparative studies with other countries: Leveraging my growing international network, I intend to develop a new subline focused on designing innovative educational initiatives and corresponding studies that connect students and educators from Spain with their counterparts in other countries through social media-based learning experiences.

Resumen del Currículum Vitae:

My academic career combines a strong foundation in education, research, and international collaboration, with a focus on integrating social media into higher education. I am Licenciade in Sciences of Physical Activity and Sport, I hold a Degree in Journalism from the Universitat de València, and a PhD in Sport Sciences, shaping my multidisciplinary approach to research and teaching. My trajectory reflects a commitment to innovation and knowledge transfer, emphasising digital tools to tackle emerging challenges in education.

I have conducted research stays at renowned institutions, including the Lithuanian Sports University, the University of Central Lancashire (Cyprus), the Universidade de Lisboa, and the University of South Carolina. These experiences enhanced my expertise and allowed me to establish robust international networks, enabling high-impact publications and educational initiatives. They also provided opportunities to refine methodologies and develop innovative approaches to integrating social media into sport management education.

I have published over 35 articles in high-impact journals, including JCR-Q1 publications in education and sport management. My research focuses on the use of platforms like LinkedIn, TikTok, and Pinterest to develop students' professional and digital competencies. Notable achievements include studies on LinkedIn for employability skills and TikTok for fostering creativity in sport sciences students, recognised both academically and socially.

In addition to research, I have led 20 educational innovation projects exploring active learning methodologies in higher education. These projects, funded by competitive grants, have resulted in tools and practices adopted by educators and institutions, highlighting my ability to design and execute impactful projects. These efforts have not only contributed to academic excellence but also generated practical tools that are currently being applied in educational and professional contexts. My work continues to inspire collaborations that bridge academia and industry, ensuring sustainable impact.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have participated in over 100 conferences, presenting research and organizing several ones. Since 2020, I have evaluated Erasmus+ projects for SEPIE, assessing over 34 proposals, and contributed as a reviewer for high-impact journals, ensuring rigorous dissemination of research.

My teaching includes supervising undergraduate theses (TFGs) at UCLM and UV, guiding students in sport management and digital competencies. I have also designed and delivered three 25-hour courses on integrating social media into teaching for academic staff.

Leadership has been central to my career. As National President of ESN Spain, I led over 1,600 volunteers and represented the organisation internationally. At UV, I represented the university in the FORTHEM Alliance, participating in its Steering Committee and Lab Mission Board.

In summary, my trajectory demonstrates commitment to research excellence, educational innovation, and internationalisation. I aim to further enhance higher education by integrating digital tools, fostering professional and digital skills, and promoting cross-cultural collaborations.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: MARCELO MARTÍNEZ, PAULA
Referencia: RYC2025-054631-I
Correo Electrónico: pmarcelo@us.es
Título: Connected teacher Learning: Identity, Agency and Knowledge Transfer in Digital Networks

Resumen de la Memoria:

The accelerated digitalization of society has rendered traditional teacher development models obsolete, creating an urgent need for frameworks explaining how educators build agency in connected environments. Addressing this gap, my research explores Connected Professional Learning, defining platforms not as mere tools, but as ecosystems where professional capital is negotiated. Since my PhD in 2023 (Cum Laude), I have consolidated this line through 17 articles (8 in Q1/Q2 JCR/Scopus) as first author, 4 books, and 8 chapters within 5 competitive R&D projects.

My career trajectory reflects an evolution towards scientific independence. Securing the highly competitive Juan de la Cierva Fellowship at the University of Huelva marked a pivotal transition. This position catalyzed my autonomy, facilitating my integration into the Agora Group (HUM648) and the prestigious Red Alfamed (2022 UNESCO Global Media and Information Literacy Award). I have leveraged this platform to establish a robust leadership profile, evidenced by supervising 10 Master's theses (VIU/UNIR), serving on a doctoral thesis committee, and currently co-supervising two international doctoral dissertations (UHU).

Internationalization is the cornerstone of my strategy. My predoctoral stay at Elon University with Dr. Jeffrey Carpenter was instrumental, integrating me into a global network on "teacher learning in social networks" alongside leaders like Bret Staudt-Willet (U. Florida), Eric Richter (U. Potsdam), and Kira Baker-Doyle (U. Illinois, ARWU Top-Tier). This network is a collaborative engine: I am currently co-leading the scientific design of a proposal with Dr. Baker-Doyle for the EdPrepLab 2026 Seed Grant (Dr. Linda Darling-Hammond's network), critical to validate my research within top-tier US frameworks. Furthermore, my stay at ORT Uruguay with Dr. Denise Vaillant expanded my focus to Latin America. This collaboration is demonstrated by joint symposia at AERA 2023-Chicago; 2024-Philadelphia and ECER 2025-Belgrade, and my role as co-organizer of the Int. Conference on Social Media and Teacher Education.

I have systematically built scientific independence, leading publications without my initial research group and spearheading co-authorships with international partners. A distinctive methodological contribution is my pioneering application of Social Network Analysis (SNA) in Spain, providing a unique lens to map complex relational structures. My academic standing is reinforced by my role on the editorial board of JOTSE (Scopus Q2).

Looking forward, I propose the research line "Connected Teacher Learning: Identity, Agency & Knowledge Transfer", aimed at bridging the digital-classroom gap. It pursues three objectives: (O1) Mapping structures of connected participation to analyze how network architecture influences teacher agency using SNA; (O2) Examining the discursive and emotional dimensions of teacher digital identity through digital ethnography; and (O3) Tracing the transfer of informal digital exchange into enacted classroom innovation using a "traceability approach" grounded in Activity Theory. Expected results include actionable teacher education strategies. This RyC contract is essential to consolidate this line, enabling me to secure funding as PI in National (2026) and European (ERC) calls, establishing a post-digital teacher development benchmark.

Resumen del Currículum Vitae:

I am a Juan de la Cierva Postdoctoral Researcher at the University of Huelva within the Agora Research Group (HUM-648) and an accredited Profesor Contratado Doctor by ANECA. My research career focuses on the transformation of teacher professional learning in the post-digital age, defining the independent line of Connected Professional Learning. I hold a PhD in Education from the University of Seville (Cum Laude), funded by a competitive FPI Fellowship.

My research program has achieved high-impact productivity with a total of 17 published articles, of which 12 are indexed in WOS and 10 in Scopus. I am the first author on 7 of these articles, reflecting a clear evolution in my co-authorship network from home-institution researchers to scholars from other universities and countries. My impact metrics include 4 JCR Q1, 4 JCR Q2, 7 SJR Q1, and 7 SJR Q2 publications. This output has accrued 91 WOS citations and 93 Scopus citations (avg 9.3), resulting in an h-index of 6 (WOS) and 5 (Scopus). Beyond journal articles, my scientific production includes 7 books (4 as editor in Octaedro, ranked SPI Q1, and 3 international volumes in Brazil) and 8 book chapters in prestigious publishers (Octaedro SPI Q1). I have presented over 20 contributions at top-tier international conferences, highlighting symposia with other international high-level researchers at AERA (Chicago 2023, Philadelphia 2024) and ECER (Belgrade 2025). As an active member of the AERA SIG-TACTL (Technology as an Agent of Change in Teaching and Learning), I participate in global dialogues on digital transformation in education. I co-organize the International Conference on Social Media and Teacher Education, demonstrating strong convening power. I maintain stable partnerships with global leaders like Dr. Jeffrey Carpenter (Elon University, USA), Dr. Kira Baker-Doyle (University of Illinois) and Dr. Denise Vaillant (ORT University, Uruguay) establishing strategic axes in North America and Latin America.

I have participated as a working team member in 5 competitive R&D projects (e.g., PGC2018, TED2021, PROYEXCEL, PID2023, PID2024). Crucially, I have assumed leadership roles in 5 major transfer contracts: I secured a strategic technical role in the DigitAll Project (Ministry of Universities), designing DigComp certification tools. Furthermore, I spearheaded the techno-pedagogical design of the Digital Competence Programme in Cuba (OEI) and the Induction Programme in the Dominican Republic (MINERD), transferring research models to national public policies impacting thousands of teachers.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I actively mentor the next generation of researchers by co-supervising two PhD theses in the International Doctoral Program in Communication at the University of Huelva and 17 Master's/Bachelor's theses in the International University of Valencia (VIU) and UNIR. My commitment to faculty development is evidenced by the delivery of >10 specialized training courses for university professors at the University of Seville and University of Extremadura, focusing on digital innovation, educational technology and social networks in education.

Demonstrating my commitment to Open Science, I actively bridge the gap between academia and society by sharing findings on social networks and in informal outreach spaces like Café con Ciencia, as well as publishing in digital media such as The Conversation, El Confidencial



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: DÍAZ GARCÍA, JESÚS
Referencia: RYC2025-057050-I
Correo Electrónico: jdiaz@unex.es
Título: Identificación temprana y tratamiento del deterioro cognitivo a través de estrategias personalizadas de actividad física

Resumen de la Memoria:

Esta línea define un nuevo paradigma para la detección, prevención y tratamiento del deterioro cognitivo en la población adulta. Se propone cambiar la identificación del deterioro cognitivo y orientarla hacia una identificación precoz. El sistema de detección del deterioro cognitivo más utilizado a nivel europeo ha sido el Mini-Mental State Evaluation. Las últimas investigaciones parecen indicar que es necesario que las personas ya cuenten con un nivel medio-avanzado de deterioro cognitivo para que el test sea eficaz en > 80% de los casos. Además, la variabilidad intra-individual en el rendimiento cognitivo y a lo largo del día, aumenta el número de fallos cometidos por el test para la finalidad con la que fue creada. Esta propuesta RyC propone el uso de un test innovador, más continuo y exigente, como es la identificación del umbral cognitivo. Esta prueba consiste en evaluar el rendimiento cognitivo de forma continua, con un test incremental, hasta detectar el punto de inflexión en el que el rendimiento cognitivo empeora de forma consistente y significativa. Esta prueba parece más exigente, menos sensible a la variabilidad intra-individual a lo largo del día, y más relacionada con la funcionabilidad de la vida cotidiana. Por ello, se espera que permita una identificación más temprana y en estadios iniciales, con mejor pronóstico clínico. Además, y pese a que los beneficios de la actividad física sobre la cognición ya han sido demostrados, esta candidatura RyC propone realizar programas de entrenamiento BET personalizados. Estos programas, que están ya siendo utilizados en sistemas sanitarios vanguardistas de diferentes países de Europa, han demostrado ser eficientes para mejorar la salud física y cognitiva. La explicación científica es que la combinación de estímulos cognitivos y físicos potencian los beneficios sobre la salud física y cognitiva de estos estímulos, respecto a los que causan ambos estímulos por separado. Además, esta tipología de entrenamiento, que parece más dinámica y divertida, causa un alto grado de aceptación entre los participantes, favoreciendo la implicación y, por tanto, los beneficios asociados. El presente proyecto propone, por primera vez, utilizar el umbral cognitivo para diseñar estímulos cognitivos específicos (basados en % del umbral) para cada sujeto, lo cual parece clave para diseñar estímulos correctos para lograr beneficios. Por último, una de las mayores rupturas que propone el presente proyecto es la realización de dichas pruebas y entrenamientos por parte de educadores físico-deportivos y ubicados en los centros de atención primaria de los sistemas sanitarios. Para garantizar la viabilidad de la propuesta, los educadores físico-deportivos, contratados predoctorales en su mayoría, llevarían a cabo pruebas de bajo coste (umbral cognitivo) y utilizarían apps ya diseñadas (SOMA-npt) para prescribir los ejercicios y notificar a los sujetos.

Resumen del Currículum Vitae:

Actualmente, el Dr Díaz-García es el IP e investigador postdoctoral en la Universidad de Extremadura (Caceres, España). Ha obtenido algunas de las convocatorias de investigación internacionales y nacionales más prestigiosas, como el programa FPU español para contratos predoctorales (tercera posición, área de Educación, convocatoria 2018), la convocatoria UK-Vanguard para contratos posdoctorales (primera posición, Medicina del Ejercicio, convocatoria 2023) o la convocatoria italiana Assegni di Ricerca para contratos posdoctorales (primera posición, Neurociencias, convocatoria 2024). Ha publicado hasta 81 artículos y 7 capítulos de libro. Sus trabajos se han centrado en la fatiga mental, sus efectos en el rendimiento y la salud, y la eficacia de las intervenciones basadas en ejercicio para mejorar la fatigabilidad mental de deportistas, personas mayores y población sedentaria. Cuando comenzó su doctorado (2019), la fatiga mental era un tema emergente. El candidato añadió de forma novedosa a la literatura que, especialmente en personas con mayor fatigabilidad (es decir, menor umbral para fatigarse mentalmente), como la población sedentaria o las personas mayores, la fatiga mental también puede ser perjudicial para la salud. También mostró que el entrenamiento combinado físico y cognitivo (Brain Endurance Training) es una forma eficaz de mejorar la fatigabilidad mental en deportistas, personas sedentarias y personas mayores. En esta línea, ha registrado hasta 3 patentes y colaboré activamente en el diseño y desarrollo de una app (SOMA-tech) para facilitar intervenciones de entrenamiento remoto a población en España y Reino Unido. Gracias a estas intervenciones, los sistemas de salud de España y Reino Unido reconocieron su contribución en la reducción de los costes sanitarios asociados a la fatiga mental (por ejemplo, mayor riesgo de caídas en personas mayores). Por estas contribuciones, también ha recibido varios premios, entre los que destacan el DUEX-research award 2023 de la Junta de Extremadura y el SEMED 2024 de la Asociación Española de Medicina del Deporte. De manera novedosa, identifiqué algunos mecanismos neuronales de la fatiga mental; esta información es de gran importancia para comprender completamente la fatigabilidad mental, sus riesgos y las contramedidas. En total, ha sido el IP en 3 proyectos internacionales, y ha colaborado con otros colegas en 2 proyectos nacionales y 7 regionales con más de 800.000 € financiados. Para difundir su trabajo, también ha participado como ponente en más de 40 congresos internacionales y nacionales. Además, ha participado en congresos y reuniones científicas con más de 70 contribuciones (comunicaciones/pósteres). Actuó como revisor externo en diferentes revistas JCR (e.j., Journal of Sport Sciences o Journal of Science and Medicine in Sport). Sus indicadores de investigación son: índice H de 19 en Google Scholar, con más de 1260 citas totales. Además, su carrera investigadora se ha caracterizado por una gran movilidad internacional, lo que me ha permitido aprender de los líderes mundiales de mi tópico de investigación. En total, ha completado un total de 40 meses de estancias internacionales, todas ellas realizadas con financiación obtenida en convocatorias de régimen competitivo (total financiación obtenida = 166.024€).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: JIMÉNEZ VILLAMIZAR, JAIRO ALONSO
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Correo Electrónico: jairojimenez@gmail.com
Título: Entre la práctica educativa y la teoría crítica: una línea de investigación sobre universidad, agencia y tecnologías emergentes

Resumen de la Memoria:

Mi trayectoria investigadora se ha desarrollado en la convergencia entre la filosofía de la educación, el estudio de las prácticas universitarias, la identidad académica, la investigación escolar y los retos que plantean las ecologías digitales en la educación contemporánea. Esta amplitud temática se sustenta en una formación internacional sólida, que incluye una Maestría en Educación en Chile y un doctorado en Ciencias de la Educación en KU Leuven (Bélgica). Esta etapa formativa consolidó una aproximación filosófica y sociomaterial orientada a comprender cómo las prácticas, los gestos educativos y los fines formativos configuran la vida universitaria.

Tras el doctorado, realicé una estancia posdoctoral financiada en la Universidad de los Andes (Colombia), donde profundicé en el análisis empírico de la docencia universitaria, la articulación entre teoría crítica y práctica educativa, y la consolidación de redes internacionales. Esta experiencia se tradujo en publicaciones en revistas Q1, capítulos de libro y presentaciones en congresos internacionales, así como en la participación en procesos editoriales y académicos. En este periodo integré el comité editorial de la revista Voces y Silencios y más adelante consolidé una actividad constante como revisor para revistas de alto impacto como Teaching and Teacher Education, Educational Philosophy and Theory y Ethics and Education.

Mi producción científica incluye artículos Q1 y Q2, capítulos de libro y dos libros editados en acceso abierto que recogen experiencias de investigación docente y desarrollos conceptuales en educación. Estas contribuciones abordan temas como las prácticas de estudio, la identidad docente y académica, la agencia de estudiantes y profesores, la investigación en la escuela y los desafíos educativos vinculados a la digitalización, la estandarización y la inteligencia artificial.

He participado en proyectos de investigación de alcance nacional e internacional, entre ellos Research in Schools and the Teacher-Researcher in Colombia, donde contribuí al diseño metodológico, a la creación de recursos en acceso abierto y a la articulación de comunidades de práctica investigativa. Actualmente soy investigador principal de un proyecto sobre ética ambiental en escuelas y he liderado propuestas internacionales, como la presentada a la Spencer Foundation. Asimismo, dentro del grupo de investigación Educación y Educadores, clasificado en la máxima categoría del sistema colombiano, he contribuido a consolidar una línea de investigación en filosofía de la educación centrada en las prácticas, la agencia y los procesos de reconfiguración institucional.

La línea de investigación que propongo para esta convocatoria, Teachers, Students and Digital Ecologies: Reconfiguring Educational Relationships in AI-Mediated Universities, amplía este recorrido mediante un examen filosófico y empírico de cómo las infraestructuras digitales y los sistemas de IA reconfiguran la vida universitaria, las prácticas de estudio y docencia, y la agencia de estudiantes, docentes e investigadores. Su objetivo es construir un marco conceptual y práctico que permita comprender y orientar la experiencia educativa en entornos mediados tecnológicamente, reforzando la misión formativa de la universidad y promoviendo modos de relación educativa basados en la responsabilidad, la co-presencia y el estudio compartido.

Resumen del Currículum Vitae:

Soy profesor universitario e investigador en ciencias de la educación, con una trayectoria consolidada en investigación, docencia y liderazgo académico a nivel internacional. Mi trabajo se centra en las prácticas de enseñanza y estudio en la educación superior, la filosofía de la educación y la formación del profesorado. He producido un cuerpo sostenido de publicaciones que incluye libros editados, capítulos de libro y artículos en revistas de alto impacto indexadas en Scopus y Web of Science, varias de ellas Q1. Estas contribuciones combinan solidez conceptual y rigor empírico mediante enfoques cualitativos y de teoría de la práctica para analizar los encuentros educativos, la identidad docente y las dimensiones éticas de la educación. Soy doctor en Ciencias de la Educación por KU Leuven (Bélgica), donde desarrollé una investigación filosófica sobre las prácticas de estudio universitario inspirada en la teoría crítica y los estudios sociomateriales. El trabajo fue dirigido por Jan Masschelein, uno de los filósofos de la educación más reconocidos en Europa, y por Stefan Ramaekers, destacado académico y Editor-in-Chief de Ethics and Education. Esta formación consolidó una comprensión profunda de la educación más allá de criterios de eficiencia, subrayando los gestos, fines y encuentros que dan sentido a la experiencia educativa.

He liderado equipos interdisciplinarios y coordinado proyectos de amplia escala. Como Investigador Principal, dirigí los proyectos Reimagining Rural Education y Environmental Ethics Education for Schools. El primero fue presentado a la Spencer Foundation en colaboración con investigadores de Colombia, Brasil y España; el segundo obtuvo financiación interna competitiva. Durante mi etapa posdoctoral en la Universidad de los Andes (Colombia), codiseñé iniciativas nacionales como Research in Schools and the Teacher-Researcher in Colombia, desarrolladas con los Ministerios de Ciencia y Educación y con varias universidades, fortaleciendo las capacidades investigativas de los docentes e informando debates sobre formación del profesorado. De este trabajo surgieron publicaciones de acceso abierto, informes, guías metodológicas y recursos educativos utilizados por instituciones académicas y gubernamentales.

Hasta hace poco me desempeñé como Director del Doctorado en Educación (2024-2025) y de la Maestría en Educación (2022-2024) en la Universidad de La Sabana (Colombia), donde impulsé procesos de formación investigadora, consolidación académica e internacionalización institucional. He dirigido tesis de maestría y doctorado y supervisado estancias posdoctorales, apoyando la formación de investigadores en etapas iniciales y fortaleciendo la proyección internacional de la facultad. A lo largo de mi carrera he tenido un papel central como formador de profesores, diseñando e impartiendo formación para docentes en servicio y en formación, desarrollando sus competencias pedagógicas y capacidades investigativas.

Mi trayectoria está marcada también por una amplia proyección internacional. Realicé formación especializada en Japón y he desarrollado actividades de investigación y docencia en Europa y América Latina. He colaborado con instituciones y académicos de Bélgica, España, Brasil, Chile, Perú y el Reino Unido mediante publicaciones conjuntas, participación en congresos y proyectos orientados internacionalmente.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
Nombre: TARRÉS VALLESPÍ, ANNA
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Título: Cultura educativa inclusiva y trayectorias de éxito educativo

Resumen de la Memoria:

Mi trayectoria investigadora combina veinte años de investigación y transferencia en el ámbito de la sociología de la educación, especialmente centrada en la inclusión educativa, las desigualdades sociales, la migración y las relaciones entre escuela, familias y comunidad. Dicha trayectoria pivota alrededor de mi pertenencia a la UAB, y más en concreto al grupo de investigación ERDISC, del cual soy coordinadora de proyectos. Fruto de este recorrido, he publicado en este último período en revistas indexadas Q1 y Q2, y recibido el premio de la red Children's Identity and Citizenship in Education Association 2023. También he participado en obras de libros indexados SPI - Q1 (IGI Global, Octaedro, Graó), con aportaciones sobre educación inclusiva, coeducación, investigación-acción comunitaria y participación educativa. He participado en 24 proyectos de investigación competitivos europeos, estatales y autonómicos, como los asociados a las redes europeas SIRIUS sobre educación y migraciones, ELNE y EEPN sobre liderazgo educativo colaborativo, y recientemente en dos proyectos I+D: INCLUEDUX (2021-2024), y actualmente INCLU-IA (2025-2028). He sido investigadora principal en dos proyectos competitivos de educación comunitaria e IP-2 en la Cátedra de Educación Comunitaria (con financiación de Obra Social la Caixa). He presentado más de 20 comunicaciones en congresos internacionales (BERA, EERA/ECER, EECERA, CIMIE, CICEa) y realizado una estancia en el National Educational Panel Study (NEPS) en la Otto Friedrich-Universität (Alemania), becada por la European Science Foundation.

Cultura educativa inclusiva y trayectorias de éxito educativo en la era de la inteligencia artificial. La línea de investigación se basa en comprender el impacto en los actores de la comunidad educativa del cambio en la relación docente, la forma y el contenido de los procesos de enseñanza y aprendizaje en la era de la inteligencia artificial (IA) en el marco de la inclusión educativa. El objetivo de investigación es la comprensión de los factores de desarrollo de culturas inclusivas en el nuevo paradigma de aprendizaje generado por la irrupción de la IA con especial foco en los colectivos de mayor vulnerabilidad socioeducativa, como las minorías culturales, desde una aproximación interseccional. Quiero contribuir empíricamente al desafío de la reflexión sobre cómo se afectan inteligencia artificial e inclusividad educativa para construir conocimiento útil con impacto real en las prácticas escolares a partir de metodologías y aprendizajes epistemológicos emergentes para abordar el fenómeno en las aulas (nivel micro), centros educativos (nivel meso) y sistema (nivel macro) desde una perspectiva teórica y práctica que sitúe a los protagonistas en posiciones de reconocimiento y reflexión sobre las mismas. Para el estudio del cambio social se proponen metodologías de investigación acción con uso de las etnografías y herramientas de observación longitudinal.

Resumen del Currículum Vitae:

Anna Tarrés Vallespí es Diploma de Estudios Avanzados en Ciencias Sociales en 2002 por la Universidad Autónoma de Barcelona y doctora en Sociología en la misma universidad con la tesis Alumnado de Incorporación Tardía y vinculación en el aprendizaje en contextos desfavorecidos en Cataluña. Trayectorias educativas y acontecimientos vitales hacia la continuidad escolar (Dir. Xavier Bonal) defendida en 2021. Es personal de investigación en el Equipo de Investigación en Diversidad e Inclusión en Sociedades Complejas (ERDISC) del Departamento de Pedagogía Aplicada de la Universidad Autónoma de Barcelona y profesora en el Departamento de Métodos de Investigación y Diagnóstico en Educación en la Facultad de Educación de la Universidad de Barcelona.

Ha participado en 24 proyectos de investigación competitivos europeos, estatales y autonómicos, como los asociados a las redes europeas SIRIUS sobre educación y migraciones, ELNE y EEPN sobre liderazgo educativo colaborativo y recientemente en dos proyectos I+D: INCLUEDUX (2021-2024), y actualmente INCLU-IA (2025-2028). Ha sido investigadora principal en dos proyectos competitivos de educación comunitaria e IP-2 en la Cátedra de Educación Comunitaria.

Ha participado en más de 17 contratos y convenios de transferencia con el Departamento de Educación y Formación Profesional como la Mesa de Participación para un Sistema Educativo Inclusivo (TAPSEI) o Estudio sobre género y diversidad cultural en la escuela (Wungu)) y la Diputación de Barcelona en contratos para el modelaje de procesos ciudadanos en lucha contra la segregación escolar y pactos educativos en 13 municipios. Su investigación ha estado siempre vinculada a la transferencia de conocimiento y al trabajo colaborativo con instituciones públicas y privadas.

Ha publicado en revistas indexadas Q1 y Q2, y recibido el premio de la red Children's Identity and Citizenship in Education Association 2023 y participado en obras de libros indexados SPI - Q1 (IGI Global, Octaedro, Graó). He presentado más de 20 comunicaciones en congresos internacionales como en British Educational Research Association (BERA), European Educational Research Association (EERA/ECER), European Early Childhood Education Research Association (EECERA), Congreso Internacional Multidisciplinar de Investigación Educativa (CIMIE) o Children's Identity and Citizenship European Association (CICEa).

Durante más de una década (2002-2013) formó parte de la Fundación Jaume Bofill, contribuyendo al desarrollo de indicadores sociales y en el análisis de las desigualdades sociales y educativas a nivel longitudinal y estadísticamente representativo en el Panel de Desigualdades Sociales en Catalunya. Y ha mantenido una extensa colaboración como docente en distintas universidades como la Universitat Ramon Llull, la Universitat Oberta de Catalunya, la Universitat Autònoma de Barcelona, la Universitat Politècnica de Catalunya y la Universidad de Barcelona.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias de la educación
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Título: Tecnología Educativa Inclusiva y Competencia Digital Docente

Resumen de la Memoria:

My research trajectory is grounded in the study of how digital technologies can foster equity, participation and accessibility in education. From the outset, my work has been shaped by a commitment to understanding how teachers develop the competences needed to support diverse learners, and how technological innovation can remove or reduce barriers. This has led me to develop a coherent programme of research that integrates theoretical, methodological and applied perspectives on inclusion, digital competence and emerging technologies. Across my career, I have examined the ways in which digital practices influence teaching and learning in contexts characterised by diversity, focusing particularly on how schools and universities can respond effectively to learners with special educational needs. My studies have generated empirical evidence on the limitations of current training models, the institutional gaps in accessibility, and the conditions required to implement technology in a socially responsible and pedagogically meaningful way. Through qualitative, quantitative and mixed-methods research, I have contributed to a more nuanced understanding of how educators engage with digital tools and how these interactions can be strengthened through targeted professional development. A central strand of my work has been the design and validation of instruments to assess teachers' inclusive digital competence. These tools provide measurable indicators of how well educators are prepared to address diversity in increasingly digital environments. Their international uptake demonstrates their scientific and practical relevance. Alongside this, I have produced several influential systematic reviews that organise current knowledge on assistive technologies, online learning and digital competence, establishing conceptual frameworks that guide both research and policy. These contributions propose models that relate technological innovation to accessibility, participation and teacher readiness, offering evidence on how emerging tools can expand learning opportunities when properly contextualised. International mobility has played an important role in broadening the reach of my research. Stays in Portugal and Spain have allowed me to engage in comparative work on digital transformation in higher education, strengthen cross-border collaborations and participate in projects that integrate multiple perspectives on inclusion and technological change. My current line of research builds on this trajectory and advances towards a new field of inquiry: Inclusive Artificial Intelligence (IA-I). This programme aims to develop AI-based solutions that support personalised learning pathways, enhance accessibility and provide adaptive responses for students with diverse needs. It seeks to integrate advances in machine learning, learning analytics and explainable AI with pedagogical principles such as Universal Design for Learning, ensuring that technological innovation is aligned with ethical and inclusive practices. The line also incorporates the design of teacher-training models that prepare educators to make informed, equitable decisions in digitally mediated classrooms. This emerging agenda represents a natural evolution of my work, introducing methodological innovation and responding to key European priorities in digital transformation.

Resumen del Currículum Vitae:

My research and teaching career lies at the intersection of educational technology, inclusion and teachers' digital competence, with a particular focus on learners with special educational needs and accessibility. After graduating in Primary Education and completing three Master's degrees, I obtained my PhD in Education at the University of Seville in 2023, with international mention and the highest distinction, with a thesis on teachers' digital competence to support learners with SEN. I began my career in 2018 as a contracted researcher on an R&D&I project at the University of Seville and later worked as a pre-doctoral researcher (2020-2024). Since 2025, I have been based at the Melilla Campus of the University of Granada, strengthening my engagement with multicultural and cross-border contexts. My scientific output includes over 35 indexed journal articles, most in JCR Q1 journals, together with around 80 book chapters and several monographs in prestigious publishing houses. I have presented at more than 40 national and international conferences and serve as a reviewer for JCR and Scopus journals, as well as guest editor for specialised publications. My most significant contributions include the development and validation of pioneering instruments to assess the digital competence of Special Education teachers, now widely used internationally; highly cited systematic reviews on assistive technologies and teachers' digital competence, which have informed policy and teacher-training programmes; and recent research on Extended Reality and immersive technologies for inclusion, where I act as last and corresponding author. Several of these works have received institutional awards and substantial citation impact. I have authored and co-authored influential books, including a single-authored monograph on teachers' digital competence for diversity and a co-authored volume on university teaching and autism. I am also lead editor of an internationally awarded book on educational innovation, inclusion and technology. I have participated in competitive national and regional projects on teachers' use of ICT to support learners with disabilities and on inclusive digital competence for students with autism, assuming responsibilities in systematic reviews, framework design, instrument validation, data analysis and knowledge transfer. My profile has also been strengthened through international stays at the Polytechnic Institute of Guarda (Portugal) and the University of Granada, which enhanced my methodological training and consolidated international collaboration networks. In teaching, I have lectured across degrees in Early Childhood Education, Primary Education, Pedagogy and Sport Sciences, covering General Didactics, School Organisation, Education and Diversity, and ICT in Education. I have supervised undergraduate dissertations and participated in innovation projects, integrating active methodologies, critical digital use and inclusive approaches. My trajectory shows a clear evolution towards independence and leadership, reflected in senior authorship roles, responsibility for key research tasks, supervision of postgraduate students and recognition through scientific awards, including the UNIA Digital Prize. Looking ahead, I aim to consolidate an independent line of research in Inclusive Artificial Intelligence.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: JIMENEZ GALAN, ALVARO
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Título: Attosecond Light-Matter Interaction: From Fundamental Electron Dynamics to Lightwave Electronics
Resumen de la Memoria:

My research trajectory spans attosecond physics, nonlinear optics, and quantum materials, with a consistent goal: to understand and control ultrafast electron dynamics in atoms, solids, and low-dimensional materials. I began by developing theoretical frameworks to retrieve correlated electron motion with attosecond resolution, pioneering techniques such as Rainbow RABBIT and enabling landmark measurements of autoionization dynamics. Early postdoctoral work expanded this expertise to strong-field control and characterization of chiral attosecond pulses, as well as real-time imaging of tunnelling and wavepacket reshaping.

As an independent researcher, I extended attosecond methodologies to condensed matter, establishing conceptual foundations for lightwave control of topological and valley degrees of freedom in 2D materials. These contributions led to the first all-optical realization of the Haldane model in monolayer hBN and the first ultrafast valley initialization in bulk materials, confirming my theoretical predictions and opening new directions in lightwave electronics. In parallel, I advanced reduced-density-matrix methods for high-harmonic generation (HHG) in crystals, exploring non-periodic systems.

My future research aims to transform attosecond strong-field techniques in solids into quantitative design tools for ultrafast quantum materials. I will develop ab initio descriptions of excitons under strong fields, establish a multi-scale framework coupling microscopic dynamics with macroscopic propagation, incorporate coherent phonon control, and extend simulations to realistic non-periodic and interfacial geometries. This research line will enable attosecond-resolved control of electronic, excitonic, and lattice dynamics, paving the way for reconfigurable optoelectronic functionalities and ultrafast device concepts.

Resumen del Currículum Vitae:

My research explores light-matter interaction on attosecond timescales. During my PhD, I developed theoretical tools to extract correlated electron dynamics using attosecond interferometry (PRL 113, 263001, 2014). This framework enabled the first measurement of phase variation across an autoionizing state with Anne L'Huillier's group (Nat. Comm. 7, 10566, 2016) and was key to reconstructing the real-time formation of a Fano resonance at CEA-Saclay (Science 354, 734, 2016), where I served as leading theory author on both works. We also extended the RABBIT interferometric technique to achieve record resolution (Rainbow RABBIT), now widely used to probe attosecond photoelectron dynamics. My thesis received the Spanish Royal Society of Chemistry's award for Best PhD Thesis in Chemistry.

In my early postdoctoral work, I developed computational methods for controlling and characterizing attosecond pulses (PRA 97, 023409, 2018; Opt. Exp. 25, 22880, 2017), imaging tunnel ionization in real time (Nat. Phys. 18, 417, 2022), and wavepacket reshaping (PRL 129, 173202, 2022), all validated experimentally.

My current research focuses on strong-field light-matter interaction in solids, numerical and analytical modelling to support state-of-the-art HHG experiments, and lightwave electronics - how intense fields modify electronic and quantum properties in real time. I proposed a method to manipulate topological phases in 2D semiconductors using two-color fields (Nat. Phot. 13, 849, 2019; 14, 728, 2020), later confirmed experimentally (Nature 628, 746 & Nature 628 752, 2024), where I was lead theory author.

From 2021-2023, I was a Marie Skłodowska-Curie Fellow in the groups of Paul Corkum and Giulio Vampa, performing solid-state HHG experiments (Nat. Comm. 14, 8421, 2023). In 2023, I began an Atracción de Talento CAM Grant to establish my project QUMATTO and subsequently secured national funding through a PGC grant. I currently supervise two PhD students and collaborate with top research groups from North America (Stanford, Berkeley, NRC Canada), Europe (Max-Born-Institut, ICFO) and Asia (Weizmann Institute).

I have authored 43 publications - including 3 Nature, 1 Science, 4 Nat. Photonics, 1 Nat. Physics, 3 PRL, 5 Nat. Comm., 2 Optica, and 2 book chapters - many as first or lead theory author. As PI, I have obtained over €600k in competitive funding (MSCA, Atracción Talento CAM, AEI-PGC2023). I have reviewed national (AEI-PGC) and international (SNSF, ERC-CoG) grants, regularly serve as referee for major journals, and have delivered more than fifteen invited talks, including at the recent 2025 Optica Incubator Meeting on Petahertz Electronics, where we outlined a roadmap for the field. I have organized two conferences and am co-inventor of a pending US patent on valley-polarization control using tailored fields.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: PLATANIA, ALESSIA
Referencia: RYC2025-055825-I
Correo Electrónico: a.platania90@gmail.com
Título: Associate Prof at Copenhagen U + Full Prof at Graz Uni

Resumen de la Memoria:

My research has widely evolved during my career, moving from phenomenological aspects toward novel foundational questions in quantum gravity. During my double PhD, I developed expertise in renormalization group techniques, primarily applying them to asymptotic safety (AS)—an approach to quantum gravity based on quantum field theory—and black hole phenomenology, investigating which black hole alternatives could emerge from AS. I soon realized that focusing on phenomenology alone was insufficient; I wanted to tackle formal aspects of the theory, which I found underexplored. In my first postdoc at the University of Heidelberg, where I was working under a Humboldt research fellowship, I decided to focus on two foundational issues in AS: unitarity and Lorentz invariance. I demonstrated that truncations of the effective action produce “fake” poles in the propagator—corresponding to fictitious ghosts—that dynamically decouple as the truncation order increases, thus resolving critiques suggesting that AS trivially violates unitarity. I also showed that the RG flow naturally enhances Lorentz violations toward the IR, implying that a UV completion of gravity is unlikely to violate Lorentz invariance. During this period, I began exploring ideas that would define my future research: (1) the existence of gravity-induced consistency conditions on the space of all effective field theories—an idea at the foundation of the swampland program, and (2) the possibility that AS represents an effective description emerging from a more fundamental theory like string theory. The latter idea intrigued me because string theory seems to satisfy all known consistency conditions—at least at a perturbative level, while AS remarkably constrains Standard Model parameters to be close to their experimental values.

During my second postdoc at the Perimeter Institute, I refined my vision and expertise through individual study and extensive interaction with leading researchers working on diverse approaches to quantum gravity and effective field theory. This led to my innovative program of testing AS against swampland conditions and exploring its potential role as an effective bridge between string theory and the low-energy EFT. It also motivated me to foster cross-community collaborations beyond my own research, leading me to organize large programs and conferences bringing leading experts in quantum gravity together. My efforts led to two widely recognized cross-community papers: the “Lectures in Quantum Gravity” and the “Visions in Quantum Gravity”. These will soon be complemented by a perspective on Nature Physics, where I have been invited to contribute.

The ideas I developed during my time at the Perimeter Institute inspired my proposal to extend the swampland program beyond string theory and confront landscapes emerging from diverse quantum gravity approaches. This vision enabled me to secure the Villum grant in Copenhagen, where in 2024 I started leading a research group, and to obtain a permanent full professorship in Graz at an exceptionally early stage in my career.

Now, I am determined to move to Spain and develop my career in a thriving scientific environment, contributing my expertise to a research landscape that resonates with my cultural roots and embodies my values of excellence, quality, and the nurturing of young international talent.

Resumen del Currículum Vitae:

I am a Full Professor at the University of Graz and an Associate Professor at the Niels Bohr Institute, Copenhagen. Previously, I held prestigious fellowships, including the Perimeter Institute Fellowship and a Humboldt Research Fellowship at Heidelberg University, and distinguished visiting roles at Nordita and the Origins Excellence Cluster in Munich. I hold a double PhD in Physics (cum laude) from Radboud University Nijmegen and the University of Catania, following B.Sc. and M.Sc. degrees also earned with the highest honours. I hold the Italian habilitation for Full and Associate Professor in Theoretical Physics and Mathematical Physics, and the AQU Catalunya accreditation for tenure-eligible lecturers.

My work has been recognised with multiple international awards, including the Perimeter Institute BMO Excellence Prize, the Nordita Distinguished Visitorship, the International Springer Theses Award, and the Sergio Fubini Prize. I have also been repeatedly highlighted in institutional reports and honour lists, including the Perimeter Institute Annual Report. I am also recognized as an excellent speaker (with 100+ invitations to conferences and seminars), and my profile is highly attractive for young researchers: for the PhD and postdoc positions I opened at NBI, I received 150+ and 250+ applications, respectively.

A defining aspect of my career is my ability to consistently secure competitive funding. I am PI of approximately €3.8M in grants, including a Villum Young Investigator Grant (~9M DKK) and an FWF DocFund (€1.51M). These resources allowed me not only to advance my research but also to extend my ideas to the broader quantum gravity community.

Indeed, my leadership extends beyond individual projects and aims to bring traditionally separate quantum-gravity communities together. In the past I have done so at an institutional level—founding seminar and discussion series at Perimeter Institute and NBI that became central hubs for their respective communities—and organizing some of the most impactful conferences in the broad quantum gravity community—for example, the 2023 Perimeter conference “Puzzles in the Quantum Gravity Landscape” with 800+ attendees, and the 2024 Nordita Program on Quantum Gravity, which led to two cross-community works that I coordinated: the “Lectures in Quantum Gravity” and the “Visions in Quantum Gravity”. Because of my central role in these initiatives, Nature Physics invited me to write a Perspective on the state of the field, and Quanta Magazine interviewed me for an upcoming feature on quantum gravity across approaches.

On a more formal ground, I currently serve as a group leader at the Center of Gravity at NBI, I co-lead the High-Energy Quantum Gravity group of the COST Action BridgeQG, and serve on evaluation panels for NWO, COST and other agencies, contributing to the assessment of research excellence at the international level. I am Editor for EPJP, and regularly referee for top journals including Nature, PRL, and JHEP.

I also maintain strong commitments to teaching, mentorship, outreach and equity. I have taught across all academic levels, supervised numerous students from multiple countries and contributed to mentoring programs supporting women in STEM. My outreach includes media interviews, public lectures, art-and-science collaborations, and engagement with schools and scientific institutions.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: DÍAZ BASO, CARLOS JOSÉ
Referencia: RYC2025-055099-I
Correo Electrónico: carloskdb@gmail.com
Título: Decoding Solar Energetic Phenomena Through Physics-Informed Deep Learning

Resumen de la Memoria:

My research trajectory addresses the central problem in solar physics: how magnetic energy is stored, triggered, and released in the solar atmosphere. I have systematically tackled this by bridging theoretical astrophysics with pioneering Physics-Informed Deep Learning, evolving from solving specific radiative transfer paradoxes to designing the unified frameworks required for the next generation of solar telescopes (EST, DKIST, MUSE). I have resolved the decade-long "filament contradiction" (where observations clashed with MHD stability requirements) by identifying and correcting a fundamental radiative-transfer misinterpretation regarding the background chromospheric contribution. Shifting focus to eruptive phenomena, have identified low-altitude reconnection as the precursor trigger that destabilises filaments and leads to strong flares. I further provided the first observationally constrained model of chromospheric reconnection, demonstrating that radiative losses are up to 10 times larger than canonical values used in simulations. Crucially, my work revealed that standard diagnostic techniques, which treat the solar atmosphere as independent pixels, overestimate transverse magnetic fields by up to two orders of magnitude in heated regions. To solve that, I pioneered the introduction of Neural Fields to solar spectropolarimetry and Bayesian Normalising Flows to correct for this bias and rigorously quantify measurement uncertainties. Furthermore, I have translated these theoretical insights into operational strategies, designing the operational strategies for wavelength sampling and the scientific requirements for the European Solar Telescope (EST) to maximise their science capabilities. I am currently serving as the sole European contributor to the NASA MUSE slit-disambiguation pipeline, where I have designed a new physics-based theoretical framework that produces science-ready spectra from multiplexed observations. My future line of research focuses on taking the understanding of the energetic solar phenomena to the next level while bridging the gap that currently prevents us from fully exploiting data from DKIST and Solar Orbiter. It is organised around three strategic pillars. Pillar 1: I will move beyond idealised assumptions to empirically map the build-up of free magnetic energy and systematically identify the universal topological triggers (flux ropes, plasmoid instabilities) that govern the onset of solar flares. Pillar 2: I will establish trustworthy diagnostics by replacing disjointed pixel-by-pixel inversions with continuous, differentiable Neural Fields that enforce Maxwell's equations (divergence-free conditions) while combining space- and ground-based data. Pillar 3 will be focused on transforming solar observations. I will use information theory to optimise observing modes for EST, and a completely new way of doing science by automating the discovery of rare, high-value reconnection events that any other strategy misses. This research marks a definitive transition from methodological innovation to systemic physical discovery. By correcting long-standing diagnostic errors and enforcing physical consistency in our measurements, this line will provide the reliable constraints to validate models of space weather, directly supporting Spain's leadership in this field.

Resumen del Currículum Vitae:

I am a solar physicist whose trajectory is defined by a constant integration of complex physical theory with advanced computational methods (Physics-Informed Deep Learning) to understand energetic solar phenomena, from the eruption of solar filaments to explosive flares that drive space weather. I have contributed original knowledge on the magnetic and dynamic structure of solar filaments during my PhD (La Caixa-Severo Ochoa Fellowship, IAC, 2014-2018, Cum Laude distinction), and on the physics of energy release during solar energetic phenomena as a key researcher in the ERC-StG SUNMAG (Stockholm, 2018-2022) and at the Rosseland Centre for Solar Physics (Oslo, 2022-2025). My contributions have resolved long-standing inconsistencies about filament models and provided modellers with key characteristics such as chromospheric heating rates and magnetic energy budgets, only possible thanks to the pioneering application of Bayesian and physics-informed Deep Learning solutions. Since October 2025, I have worked as an independent researcher, and I am the only European scientist involved in NASA's MUSE slit-disambiguation effort. My leadership role is objectively validated by success in competitive international evaluations. I received an A score (interview stage, 2025) for my ERC Starting Grant proposal, two Marie Skłodowska-Curie Seals of Excellence and top scores in Norwegian FRIPRO calls. I have multiple observing campaigns as PI (100% success rate) at GREGOR, DKIST, SUNRISE III, and the Swedish 1-m Solar Telescope with over 165 days of in-situ experience. I was the main organiser of the Deep Learning Workshop at RoCS in Oslo in 2024. My scientific output totals 32 peer-reviewed publications (60% produced without my PhD supervisors), which have been cited about 620 times, with 12 first-author papers. I have established a network spanning 10 institutions, with 56% of my publications involving multi-national teams. My research also leverages frontier facilities, such as the Solar Orbiter mission and the new HeSP instrument, while focusing on designing new ways to push operational limits, in particular for the upcoming European Solar Telescope. My work ensures reproducibility through nearly 40 GitHub repositories, a chapter of the book Machine Learning for Heliophysics and the Python library of the Stockholm group. I have participated in radio podcasts and motivational talks, and four talks at high schools since 2018. My dedication is recognised internationally, as evidenced by 4 invited review talks (a very rare achievement in my field), 20 awarded oral contributions at international conferences, and 12 invited seminars at leading solar physics institutions. I have successfully supervised eight projects at different levels, all conducted independently of my PhD directors, including three summer students (UiO), two bachelor's and two master's final degree projects (SU & UiO), and currently one PhD student (2022-ongoing; UiO). For the past three academic years (2023-2025), I lectured on the master's course Astrophysical plasmas at UiO (10 ECTS), with additional lectures at international summer schools (ESPD Summer School in Dubrovnik 2024), and at Stockholm University (2018). Additionally, I have served as a referee for several high-impact peer-reviewed journals as well as acted as an external examiner for one PhD and two MSc theses at UiO.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: ALDAY PAREJO, JUAN
Referencia: RYC2025-055539-I
Correo Electrónico: juanaldayparejo@gmail.com
Título: Mars Isotopes from Surface to Space: a key to deciphering the evolution of the Martian climate

Resumen de la Memoria:

Numerous lines of mineralogical and geomorphological evidence suggest that liquid water was once abundant on the surface of Mars, raising fundamental questions about the past habitability of the Red Planet. However, sustaining large amounts of surface liquid water would have required a significantly warmer and wetter climate than the one we observe today, pointing to a major evolutionary shift in Mars' climate. Isotope ratios in the atmosphere provide crucial insights into this transition, as they carry the imprints of the processes that have operated on Mars in the long term. Among these processes, atmospheric escape is believed to have played a substantial role, contributing to the enrichment of heavier isotopes in the present-day atmosphere.

Reconstructing the evolution of Mars' atmosphere from isotopic signatures requires detailed information about the rates at which the isotopes escape to space and the many atmospheric processes that govern this escape. Since the start of my doctoral studies, my main research line has aimed at understanding the variability of the isotopic composition of Mars' atmosphere, as well as at providing a detailed inventory of the processes that induce isotopic fractionation. In particular, my analysis of the altitudinal variability of the C, O and H isotopic ratios on Mars from the ExoMars Trace Gas Orbiter (TGO) has revealed that these are affected by a variety of processes involving cloud formation mechanisms, photochemistry, and the dynamics of the atmosphere, all of which affect the relative escape of the heavy and light isotopes to space in the upper atmosphere.

After my doctoral studies I expanded my scientific skills through the analysis of isotopic measurements from ground-based observatories. In particular, my analysis of spectroscopic observations from the SOFIA observatory provides important constraints on the global budget of H and O isotopes in Martian water, and suggest that interactions with the Martian regolith may produce variability currently unexplained by numerical models of the atmosphere. Building on this expertise, I led a coordinated observing campaign to measure the carbon isotope composition of the Martian atmosphere with the NASA Infrared Telescope Facility and the ExoMars TGO, to determine the simultaneous horizontal and vertical fractionation of the carbon isotopic reservoir.

In this fellowship, I aim to undertake the most comprehensive investigation of the C, N and O isotopic reservoirs on Mars to date through the combination of multi-spacecraft observations and the development of next-generation numerical models accounting for isotopic fractionation. Specifically, I will perform the analysis of isotopic measurements from the ExoMars TGO, NASA's MAVEN and JAXA's MMX mission, all of which are highly complementary, providing information about the isotopic reservoir at different altitudes from the near-surface to space. This will be combined with the development of photochemical and escape models accounting for isotopic fractionation. By unifying these distinct observations and modelling efforts, this project will offer unprecedented insights into the escape history of the atmosphere and the overall evolution of Mars' climate.

Resumen del Currículum Vitae:

Since beginning my doctoral studies, I have embraced the expertise of the groups I have worked with, developing a versatile set of tools to support my growth as an independent and interdisciplinary scientist. During my doctoral work at the University of Oxford with Prof. Patrick Irwin I became an expert in radiative transfer and the analysis of observations from remote sensing orbiters. In my postdoctoral work with Prof. Neil Bowles at Oxford, I gained experience in the optimisation of spectral filters to maximise instrument performance. During my fellowship at the University of Tokyo working with Dr. Shohei Aoki I learnt from his expertise in the analysis of ground-based telescope observations. In my postdoctoral work in the lab of Prof. Manish Patel at The Open University I embraced their expertise in modelling the atmosphere of Mars through the development of my own photochemical model and the implementation of isotope fractionation schemes in the Mars Planetary Climate Model.

Overall, my leadership and participation in international projects have led to the publication of 40 articles in high-impact, peer-reviewed journals (9 as first author), which have collectively accumulated more than 1,400 citations and an h-index of 20. However, I consider the quality and novelty of my work to be best recognised by my involvement on important several international teams. For example, I lead the isotopic investigations of the ACS instrument on the ExoMars Trace Gas Orbiter (TGO), providing crucial constraints on fractionating processes in the Martian atmosphere. The quality and significance of these isotopic investigations led to my appointment by the European Space Agency to the Mars Science Strategic Team for JAXA's Martian Moons eXploration mission, where I will contribute to the interpretation of isotope escape measurements from its mass spectrometer. Additionally, my expertise in the analysis of spectroscopic observations of Mars has also secured me a place in the Science Working Team of the Enfy instrument aboard the ExoMars Rosalind Franklin Rover, where I contribute to defining the atmospheric science objectives from the instrument, and the pre-selected instruments for LightShip, BEBOP and DESI, where I led the technical definition of their spectral filters.

Apart from the publication of my research outputs in scientific journals, I have presented my research at numerous scientific meetings and have been invited to give seminars at different institutions around the world. Additionally, I have been the developer of two open-source python packages: ArchNEMESIS, a versatile radiative transfer and retrieval tool now used at several institutions across the world; and pchempy, a 1-dimensional photochemical model for simulating the isotopic fractionation in planetary atmospheres. These tools are central to both my own research and my group's work, as students I supervise actively use them in their projects.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

In summary, I am confident that my leadership across scientific, technical, and mission-operational activities has equipped me with the skills and independence required to drive world-class research. I am fully committed to strengthening my research career in Spain, while contributing to the excellence, growth, and international visibility of the Spanish planetary science community.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: REGO CABEZAS, LAURA
Referencia: RYC2025-057311-I
Correo Electrónico: laura.rego@csic.es
Título: Generación y aplicación de pulsos láser de attosegundo
Resumen de la Memoria:

En mi investigación contribuyo tanto al estudio de las propiedades de los pulsos de attosegundo y su generación, como a su aplicación para estudiar propiedades moleculares, así como al desarrollo de herramientas computacionales para la simulación de los fenómenos ultrarrápidos.

Mi trayectoria hasta la fecha puede resumirse de la siguiente manera. En primer lugar, durante los 4 años de doctorado (contrato FPU) estudié la generación de armónicos de orden alto con luz estructurada, y cómo se generan los pulsos láser de attosegundo, con énfasis en el estudio de sus propiedades de momento angular. En segundo lugar, durante los últimos 4 años (como investigadora posdoctoral Margarita Salas, investigadora posdoctoral contratada y líder junior), he trabajado en la aplicación de esas herramientas: empleando luz estructurada para investigar moléculas quirales y usando pulsos de attosegundo para estudiar la dispersión Raman de rayos X estimulada e impulsiva en agua líquida, así como la fotoionización molecular. Por lo tanto, he adquirido experiencia en una amplia variedad de temas dentro del campo de la física ultrarrápida. Mi labor de investigación se ha llevado a cabo en 6 instituciones diferentes (2 internacionales) y se ve reflejada en la publicación de 21 artículos en revistas de revisión por pares, con un total de 1557 citaciones, y he difundido los resultados de mi investigación en 31 contribuciones.

Con la Ayuda Ramón y Cajal me gustaría seguir investigando las interacciones láser-materia ultrarrápidas, creando conexiones entre las distintas líneas que he abordado hasta la fecha y reuniendo así diferentes subáreas de la attociencia. Mi objetivo es iniciar nuevos caminos y colaboraciones, pero también crear herramientas computacionales integrales. Mis objetivos para los próximos años son los siguientes:

1. Estudiar la interacción de la materia quiral con la luz estructurada en nuevos paradigmas. Para ello planeo continuar mi colaboración con Dr. Ayuso (Imperial College London) y Prof. Smirnova (MBI, Berlín). Abriré nuevas rutas, como el estudio de sólidos quirales interaccionando con luz quiral y la influencia de los efectos relativistas en los estudios de quiralidad.
2. Continuar con el estudio de rayos X en muestras líquidas en colaboración con Prof. Marangos (Imperial College London) y Dr. Picón (Instituto de Ciencia de Materiales de Madrid).
3. Combinar mi experiencia en la polarización de la luz con mis nuevos conocimientos sobre fotoionización molecular en colaboración con el Prof. Martín (Universidad Autónoma de Madrid) para estudiar los efectos de la polarización de los pulsos de attosegundo en los espectros de fotoelectrones.
4. Integrar las herramientas numéricas que he desarrollado durante mi carrera en un único y completo código informático de acceso abierto. Para ello, ampliaré las herramientas desarrolladas hasta la fecha, por ejemplo incluyendo polarizaciones tridimensionales. Este código permitirá simular una gran variedad de escenarios de interacción láser-materia.

Resumen del Currículum Vitae:

Mi formación académica es un Grado en Física (2016), Máster en Física y Tecnología del Láser (2017, Premio Extraordinario) y Doctorado en Física Aplicada (2021, Premio Extraordinario). Antes de mi doctorado, trabajé en la Universidad de Salamanca (USAL) en la generación de vórtices ultravioleta mixtos, lo cual dio lugar a 5 publicaciones (Premio Arquímedes).

Durante mi doctorado con beca FPU trabajé en la USAL supervisada por el Prof. Plaja y el Dr. Hernández en:

1. El estudio de los fundamentos de la generación de armónicos de orden alto, incluyendo una estancia de 3 meses con la Prof. Anne L'Huillier en la Universidad de Lund (2 publicaciones).
2. La creación de armónicos de alta orden con nuevas propiedades de OAM (2 publicaciones, incluyendo Science como primera autora, en colaboración con el grupo experimental Kapteyn-Murnane (JILA, Boulder).
3. La generación de pulsos de attosegundos con nuevas propiedades de polarización (6 publicaciones), publicaciones en colaboración con el grupo del Prof. Chen de la Universidad Tsing Hua (Taiwan), 1 en colaboración con JILA y 1 en colaboración con ICFO.

Desde enero de 2022 hasta diciembre de 2023, he sido investigadora posdoctoral Margarita Salas. He llevado mi experiencia en HHG con luz estructurada al ámbito de la química ultrarrápida, beneficiándome de las 2 siguientes estancias. Durante 2022 (1 año) trabajé en el grupo del Prof. Marangos en Imperial College London en:

1. Aplicar luz estructurada a la investigación de la quiralidad ultrarrápida: Desarrollo de nuevos esquemas ópticos usando luz estructurada con el Dr. Ayuso (3 publicaciones).
2. Apoyo teórico para los experimentos de dispersión Raman impulsiva de rayos x en agua (1 publicación).

Durante 2023, trabajé en la temática de fotoionización molecular en el grupo del Prof. Martín en la Universidad Autónoma de Madrid, investigación que continué como investigadora posdoctoral en IMDEA Nanociencia entre enero y octubre de 2024 (2 trabajos en progreso en colaboración con grupos experimentales). Además, he escrito 2 artículos de perspectivas.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Desde noviembre de 2024 disfruto de un contrato "La Caixa Postdoctoral Junior Leader" de duración de 3 años y el cual me ha permitido liderar mi primer proyecto de investigación, iniciando mi propio grupo de investigación, para lo cual he contratado a una investigadora predoctoral con quien investigo la quiralidad ultrarrápida usando pulsos láser estructurados (2 manuscritos en preparación, 6 nuevos proyectos en proceso). Además, se me ha concedido un Proyecto de Generación de Conocimiento 2024 (AEI) como IP (PID2024-163024NA-I00).

Mi número total de publicaciones es 21 (+2 en revisión), siendo 8 de primera autora, 1 de última autora y 15 colaboraciones internacionales. Mi índice h es 14 y mi número de citas es 1557 (GS). He realizado 31 contribuciones a conferencias, siendo ponente invitada en 7 y recibiendo 3 premios. He desarrollado numerosas herramientas de software para simular la interacción láser-materia, desde la escala microscópica hasta la macroscópica.

También he realizado 214 horas de docencia y he supervisado a un doctorado (en progreso), un TFM, un TFG, 2 proyectos UROP y un proyecto de verano. Coorganizo una escuela anual para jóvenes investigadores y he participado y organizado decenas de actividades de divulgación, como miembro y presidenta de la OSAL Student Chapter.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: XIE, HONGCHAO
Referencia: RYC2025-056069-I
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Título: Engineering strong exciton-spin coupling through nanomechanical integration

Resumen de la Memoria:

Since the early years of his scientific career, Dr. Hongchao Xie has focused on exploring the magnetic, optical, and mechanical properties of two-dimensional (2D) quantum materials and their tunability through various stimuli such as strain, twist angles, and lattice stacking modulations. With a particular focus on van der Waals (vdW) materials, Dr. Xie has advanced the understanding of moiré superlattices and their impact on magnetic and excitonic behaviors. His work integrates cutting-edge fabrication techniques with advanced optical and mechanical characterization, bridging fundamental physics with potential applications in technology.

Dr. Xie completed his Ph.D. in Physics at Penn State and Cornell, where he worked under the mentorship of Profs. Kin Fai Mak and Jie Shan. During this period, he developed novel methods for fabricating and probing suspended 2D materials, including the first demonstration of exchange magnetostriction in 2D antiferromagnets and tunable exciton-optomechanical coupling in monolayer semiconductors. These pioneering works have had significant implications for the development of next-generation electronic and optoelectronic devices.

Following his Ph.D., Dr. Xie continued his research as a postdoc at the University of Michigan, where he focused on emergent magnetism in magnetic moiré superlattices. Here, he played a key role in uncovering new magnetic states, such as non-collinear spin textures, in twisted bilayer antiferromagnets. His work highlighted how twist engineering could induce complex spin configurations and magnetic phase transitions, paving the way for innovative spintronic devices.

In late 2022, Dr. Xie returned to China as a tenure-track associate professor at South China University of Technology, where he established an independent research group. His current research focuses on three major themes: 2D magnet-superconductor interfacial effects, novel magnetic excitations in twisted 2D magnets, and the nanomechanical probing of emergent spin phenomena. These efforts are supported by prestigious grants, including the NSFC Excellent Young Scientists Fund (Overseas) and other national and regional initiatives, all under Dr. Xie's leadership.

Dr. Xie has made significant contributions to the field, publishing 14 articles in high-impact journals such as Nature Physics, Nature Materials, Nature Communications and Nano Letters. His work has garnered over 1000 citations and an h-index of 12 (Google Scholar). He has actively disseminated his research at numerous international and national conferences, including 11 invited talks. Dr. Xie has also served on the organizing committees of prominent scientific events and received several awards, including the Chinese Government Award for Outstanding Self-Financed Students Abroad.

With the support of the Ramón y Cajal fellowship, Dr. Xie aims to further advance the understanding of vdW quantum structures through research on the development of supermoiré multilayers for quantum technologies, and mechanical detection and modulation of moiré phases using nanoelectromechanical systems (NEMS), emphasizing on strong exciton-spin coupling systems. These research directions are expected to drive significant advances in spintronics, quantum computation, and nanoscale sensing technologies, thus pushing the boundaries of modern material science.

Resumen del Currículum Vitae:

Dr. Hongchao Xie is a condensed matter physicist specializing in two-dimensional (2D) quantum materials and moiré superlattices. His research integrates advanced optical spectroscopy with device platforms to uncover exotic electronic and magnetic phenomena and explore their potential in next-generation information technologies. He has made several pioneering contributions, including the first demonstration of 2D magnetostriction in atomically thin magnets (highlighted by Nature Reviews Materials) and tunable exciton-optomechanical coupling in suspended 2D semiconductors. His postdoctoral work revealed emergent long-range orders and non-collinear spin textures in moiré magnets (Nature Physics News & Views). He has published high-impact papers as first/co-first author in Nature Physics (2023, 2022), Nature Materials (2020), and Nano Letters, with >1000 citations (h-index 12, 90% since 2020), evidencing his international impact.

Dr. Xie completed his MPhys in Physics (2014) under the mentorship of Nobel laureate Prof. Kostya Novoselov. He earned his Ph.D. in Physics at Penn State University (2019, advisors: Kin Fai Mak and Jie Shan [APS Fellows, Directors of MPI for the Structure and Dynamics of Matter, Editorial Boards of Science (Shan) and PRX (Mak)]) with visiting training at Cornell University, followed by a postdoctoral fellowship at the University of Michigan with Prof. Liuyan Zhao [APS Fellow, PRX Editorial Board]. He has consistently defined new research directions, from exciton-optomechanical coupling to quantum magnetism in moiré materials. His expertise spans materials preparation, device fabrication, and advanced spectroscopic probes, enabling him to independently design and realize cutting-edge experiments.

Since late 2022, Dr. Xie has been a tenure-track associate professor at South China University of Technology, where he founded an independent research group from scratch, building a state-of-the-art low-temperature, high-magnetic-field spectroscopy-transport platform. He currently supervises 2 Ph.D. and 3 M.Sc. students, demonstrating his ability to train the next generation of researchers. He has successfully secured >10 competitive research projects as a principal investigator (PI)/Co-PI with amount of over \$0.9M, including 3 national-level NSFC grants (e.g., Major Research Plan-Incubation Project, among the most competitive schemes for young investigators in China), and has contributed to U.S. programs such as NSF CAREER, AFOSR MURI, and ARO/AFOSR YIP. These leadership roles demonstrate his ability to define original research directions, attract substantial funding, and manage multi-institutional collaborations.

Dr. Xie has been awarded the NSFC Excellent Young Scientists Fund (Overseas, 2023), one of China's most prestigious honors for early-career researchers. He serves as referee for leading journals (such as Materials Today, npj Quantum Materials), evaluator for national thesis awards, and organizer of international conferences (e.g., Nature Conference on Low-Dimensional Electronics 2025). He has been invited to present at major conferences such as the Conference of Condensed Matter Physics (2024) and the China-Germany Bilateral Meeting on Topological Devices and 2D Spintronics (2023), and has delivered >20 invited seminars worldwide (such as UMich, NYU), reflecting his strong scientific visibility and recognition.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: BIEKOTTER, THOMAS
Referencia: RYC2025-056311-I
Correo Electrónico: thomas.biekotter@tutanota.de
Título: Física Teórica de partículas y fenomenología a altas energías

Resumen de la Memoria:

My scientific trajectory focuses on theoretical particle physics and its connections to early-universe cosmology, with a particular emphasis on the dynamics of electroweak symmetry breaking the search for new physics via collider experiments and future space-based gravitational-wave observatories. My research addresses two of the most fundamental open questions in modern physics: the origin of the matter-antimatter asymmetry of the universe and the nature of dark matter. Both questions may be tightly linked to the Higgs mechanism, whose underlying dynamics remain largely unknown.

My work concentrates on models with extended scalar sectors, which can explain the matter-antimatter asymmetry via a mechanism called electroweak baryogenesis, and they provide new particles that can be valid dark matter candidates. I explore the phenomenology of these models at colliders and their potential in realizing strong first-order electroweak phase transitions; a vital ingredient for electroweak baryogenesis and capable of producing a primordial gravitational-wave background detectable with LISA.

After completing my PhD at the Instituto de Física Teórica in Madrid, I built my career at the leading international research centers DESY in Hamburg and KIT in Karlsruhe, consolidating a trajectory marked by internationalization and collaboration with top groups. My scientific output exceeds 25 publications, with significant impact in Higgs phenomenology, searches for new physics at the LHC, and the study of cosmological phase transitions.

A distinctive feature of my trajectory is my independent leadership. I have initiated and developed research directions on my own, including the application of genetic algorithms and advanced statistical methods to explore the high-dimensional parameter space of BSM models. This work has led to the creation of evotran, a modern, parallelized, high-performance library for evolutionary optimization. Furthermore, I am a core developer of HiggsTools, a widely used framework for global interpretations of Higgs searches and measurements, which places me at the interface between theory and experiment and contributes significantly to open science.

Since 2025, I serve as theory convener of the Extended Higgs Sectors subgroup of the LHC Higgs Working Group, a competitive appointment that recognizes my international leadership and enables me to actively shape experimental strategies for Run 3 and the HL-LHC. In parallel, I maintain close collaborations with the LHC Dark Matter Working Group and researchers from CMS and ATLAS, particularly on developing searches sensitive to the dynamics of extended Higgs sectors and signatures of electroweak phase transitions.

My future research is organized around two main axes: (1) exploring the structure of extended scalar sectors through new LHC search strategies and precision global analyses, including top-quark polarization observables, and (2) establishing a robust, quantitative connection between collider experiments and gravitational-wave signals from cosmological phase transitions, providing the first realistic, data-driven prospects for LISA informed by HL-LHC results. This unique combination of phenomenological expertise, computational tools, and work at the frontier between theory and experiment defines an ambitious scientific agenda with high impact potential over the coming decade.

Resumen del Currículum Vitae:

I completed my PhD in Theoretical Physics at the Instituto de Física Teórica (IFT-UAM/CSIC) in Madrid (2015–2019) and subsequently held postdoctoral positions at the Deutsches Elektronen Synchrotron (DESY) Hamburg (2019–2022) and the Karlsruhe Institute of Technology (KIT) (2022–2024), Germany. In November 2024, I began my current appointment as a la Caixa Junior Leader at the IFT, where I lead an independent three-year research project as principle investigator. Since this year, I serve as Theory Convener for the “Extended Scalar Sectors” subgroup of the LHC Higgs Working Group.

My research focuses on collider physics, Higgs and dark-sector phenomenology, and new connections between particle physics and early-universe cosmology. In particular, I explore the interplay between high-energy particle colliders and future space-based gravitational-wave astronomy. According to INSPIRE (counting only publications with ten authors or fewer), I have an h-index of 18, over 1300 citations, 24 peer-reviewed articles in leading journals, and three preprints under review. I have presented my work at more than 50 scientific events, including over ten invited conference talks in several countries, among them plenary presentations at CERN and the Rencontres de Moriond.

I have an established record in mentoring early-career researchers. I have co-supervised two Master’s theses and two Bachelor’s theses, and I closely mentored three PhD candidates who carried out their degree at DESY. My mentoring was a significant part of their supervision and has led to several joint publications. All three PhD candidates obtained

competitive fellowships or distinctions for their work. My current supervision includes a postdoctoral research assistant hired with my own grant in November 2025, as well as two Master’s student at the IFT in Madrid and DESY Hamburg, respectively. My teaching experience spans several institutions and levels. I spent three years as a tutor during my undergraduate and Master’s studies at the University of Münster. At KIT, I served as a teaching assistant for three semesters, taking responsibilities for organizing tutorials, preparing problem sets and exams, conducting tutorials, lecturing in place of the main instructor, and participating in the evaluation of written and oral exams. The first-year Bachelor’s course with more than 200 students, where I was solely responsible for coordinating the problem classes and the written exams, received the second-highest student evaluations of all BSc Physics lectures at KIT in the summer semester 2024.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

I have demonstrated the ability to write successful grant applications and secure competitive research funding. Currently, I am the principal investigator of a three-year la Caixa Junior Leader research grant titled “Exploring the Unknown: Bridging the LHC and Gravitational-Wave Astronomy in the Search for New Physics and Hidden Sectors.” This fellowship provides substantial resources for independent research, including a funding for personnel, travel, and international collaborative activities. My research group currently includes one postdoctoral researcher (joined in November 2025) and one Master’s student. Additionally, my PhD was supported throughout its full duration by a prestigious personal fellowship from the “la Caixa” Foundation, which included dedicated funds for travel and advanced training.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: REBOLLIDO VÁZQUEZ, ISABEL
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Título: The complexity of planetary systems: an in-depth look into minor bodies

Resumen de la Memoria:

Exoplanets are now known by thousands, and the number keeps increasing thanks to the technological advances, and pushed at the same time by the interest of the public in answering the centuries long question: "Are we alone?". However we keep neglecting some of the factors that might affect the appearance of life in astrobiology studies. We know minor bodies, such as asteroids, comets and protoplanets were fundamental in the shaping of our Solar System, taking part in the creation of the Moon, and possible altering the chemistry of the terrestrial zone, allowing for the presence of high amounts of water and volatiles.

During my years in research, I have focused on the investigation of the variable components around main sequence stars, that trace the material evolving and affecting the chemistry and dynamics of the planetary system. I have used high resolution spectroscopy to investigate the gas released from evaporating bodies, a.k.a. exocomets. The research started during my PhD thesis, and maintained through the years to ensure a proper time follow up of the variable exocomet phenomenon, has resulted in 8 peer-reviewed publications.

Given the complexity of the circumstellar material and its components (dust, gas, minor bodies), I turned to other facilities to try and probe different aspects of it. ALMA observations obtained in Cycle 7 allowed me to investigate the coldest component of the gas, which I complemented with JWST Cycle 1 and CRISP+ observations granted in P116, which will observe the warmer gas in the inner regions of the systems. For the investigation of the dust component, I was granted CHEOPS AO1 and AO5 time, which enabled the study of the variable dust. Along this, I was able to participate in the JWST GTO 1411 program, leading one of the papers of the team, in which I studied the dust in near and mid-IR. All these lines of study have developed in new observations and collaborations that are still ongoing.

During the Ramón y Cajal Fellowship, I plan to investigate the impact of minor bodies in the architecture, composition and habitability of planets and planetary systems, and the link to the history of our own Solar System. I will combine theoretical and observational studies to disentangle how minor bodies are affecting the evolution of exo-planetary systems through collisions and transport of materials. In order to assemble a team of dedicated scientists, I will make use of the Ramón y Cajal funds, as well as apply to European and Spanish grants (e.g. ERC Starting, Proyectos de Generación del Conocimiento, etc). Ongoing and future collaborations with international astronomers will also provide indirect funding.

The scientific goals of this project will be divided into 4 main goals: Volatile delivery mechanisms from ground and space based observations, focusing on observations of molecules such as CO; revisit of candidate exocomet-host stars, which requires a careful analysis and time follow-up to distinguish exocomets from other events that can cause variability; the connection between spectral type and evaporation mechanisms, which might be connected to the current observational bias, where exocomets are only found in spectroscopy around A-type stars; and photometric studies of exocomets with CHEOPS, PLATO and TESS, that allows the investigation of the dust component released in exocometary evaporation.

Resumen del Currículum Vitae:

I obtained my PhD in 2020, awarded by the UAM, graded Cum Laude, supervised by Prof. Eva Villaver and Dr. Benjamín Montesinos. I focused on the study of the gaseous environment of A-type main sequence stars with spectroscopy to search for features of exocomets. I led the analysis of the largest sample of stellar spectra in the search for exocometary features to this date, summarized in a total of 5 refereed papers by our group (2 as first author), creating a statistically significant sample for the first time.

I participated in over 15 observing campaigns either alone or leading the observations, and wrote several proposals to monitor exocomet-host stars and the gaseous component of debris disks, with accepted proposals in ALMA, CHEOPS, IRTF and CAFOS.

I did a postdoc at the STScI (Baltimore, USA) between 2020-2023. I led the analysis and publication of JWST data of the debris disk around β Pic with coronagraphy, featured in press notes by NASA, ESA and CAB. I was granted JWST time to investigate the gas around main-sequence stars, along a ~\$90K grant for research activities. I joined the JWST Early Release Science Team 1386 and the JWST Telescope Science Team, along the NASA Study Analysis Groups (SAG) as one of the leaders of SAG 23 to investigate exozodiacal dust, coordinating a team of over 20 scientists. I joined the POEMM mission approved by NASA and expected to fly in 2029, where I am currently the lead for the Gas in Debris Disks science case. The initial budget of the mission is 20M USD.

I was awarded a Juan de la Cierva fellowship to join CAB (Madrid) in 2023. During this time, I was awarded CHEOPS AO5 and ESO P114 proposals, along other 7 as co-I in HST and JWST. I joined the coordination committee for Birth and Evolution working group for HWO, and the CHEOPS Science Team (over 120 members), where I now coordinate the HST taskforce to lead the preparation of proposals and synergies between the two telescopes.

In January 2024, I joined the European Space Agency (ESA) as Research Fellow. As part of my functional time, I joined the PLATO science team, participating in the target selection. I was recently awarded an "Atracción de Talento" César Nombela fellowship, and will join CAB in 2025 with funding for 5 years, and 220k € for research activities.

Overall, I am part of 56 refereed papers with 978 citations, plus other non-refereed papers (e.g. white papers), totaling 118 publications and 995 citations. I have been cited 394 times in 2025 (289 in 2024), showing the increasing impact of my work. I have been awarded 1.1M € in grants as PI, and over 23M € including co-I grants.

I have participated in the organisation of 5 international high profile conferences (e.g. Spring Symposium at STScI), and have started and continue to coordinate the research group "Planetary Systems" at ESAC campus.

I have supervised 5 master thesis to term, and have one master student this year; which resulted in the development of 3 papers.

I am part of the Women in Astronomy Commission of the Spanish Astronomical Society, where I lead the successful mentoring program, with 40-50 participants per year. I have significant participation in different public media channels and have been featured in multiple national and international media journals. In September 2024 I was invited to write a News and Views piece for Nature.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: CASCALES SANDOVAL, JUAN PEDRO
Referencia: RYC2025-054299-I
Correo Electrónico: juanpedro.cascales@gmail.com
Título: From Solid State Physics to Medical Device Development; The search for wearable devices to monitor new biomarkers.

Resumen de la Memoria:

My research experience spans Solid-State Physics, Nanotechnology and Medical Device Development. I received a B.Sc. in Physics from the Universidad de Murcia (2010), followed by an M.Sc. (2011) and Ph.D. (2015) in Condensed Matter Physics and Nanotechnology from the Universidad Autónoma de Madrid. Under the mentorship of Prof. Farkhad Aliev, I characterized electron transport in spintronic sensors and developed a technique to optimize micro-fabricated position detectors, leading to my first patent. I gained experience in automated experimental systems, electronics, data processing and modelling. My dissertation (suma cum laude) was supported by a FPI Fellowship.

After my PhD, I joined Dr. Jagadeesh Moodera's group at MIT (2015–2017), where I worked on hybrid magnetic, superconducting, organic and topological materials for novel electronic devices. I developed a switchable Josephson junction (later patented), mastered thin-film fabrication and characterization, optical and electron lithography, and co-authored a book on noise in spintronics.

At MIT I came in contact with biomedical engineering and shifted my focus toward medical device development. In 2017 I joined Professor Conor Evans' group at the Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School. There, I led the development of wearable devices for non-invasive tissue oxygenation monitoring, involving materials engineering, low-power flexible electronics, 3D printing, design of experiments, signal processing and physical modeling. I built an entirely new platform technology within the group, led human clinical trials and animal studies, and collaborated with multinational companies (3M, P&G) to translate the technology into medical consumer products. In 2020 I was promoted to Research Scientist at MGH.

Since February 2023, I am a senior postdoctoral researcher (Atracción de Talento CAM) at the MatNaBio group, Facultad de Farmacia, Universidad Complutense de Madrid. Despite my relatively short time in the group, I have established myself as an independent leader, launching a new research line and serving as PI/co-PI on three competitive research projects, for which we are already obtaining promising preliminary results. In just two years, I have secured over 500k€ as PI, contributing directly to the financial health of my group and institution. I lead a multidisciplinary team, manage research funds, develop experimental tools from the ground up, and supervise Bsc, Msc theses and 2 PhD students.

My work has been published in 37 articles (15 as first author, 6 as corresponding author) in international journals, and I have co-authored 1 book on electronic fluctuations in spintronics. Focused on technologically relevant research, my work has led to 7 patents (3 granted, 4 pending), 2 of them licensed to 3M. I have 28 conference contributions as presenting author (including 2 best poster awards) and over 30 as co-author, 4 invited talks, sessions organized at international conferences, and 4 invited seminars.

In just three years, I have successfully established a new research agenda at the UCM, acquiring new physical principles, experimental methods and materials-engineering skills, and consolidating a competitive and collaborative independent trajectory.

Resumen del Currículum Vitae:

My research experience spans Solid State Physics/Nanotechnology and Medical Device Design. During my PhD at UAM (2010–2015) and my first postdoctoral stage at MIT (2015–2017), I investigated electron transport and noise in optical, magnetic and superconducting solid-state devices. In this period I gained independence as an applied physicist, building automated experimental setups, designing and fabricating micro-devices and sensors, and developing expertise in data analysis and modelling.

In Boston I became passionate about applying my background to miniaturized biosensors, and in 2017 I joined the Massachusetts General Hospital, Harvard Medical School. At the Wellman Center for Photomedicine I led the development of a wireless, optical wearable device for non-invasive tissue oxygenation monitoring, coordinating a small team and integrating materials engineering, flexible electronics, optics and signal processing.

Since 2023, in my position at the Universidad Complutense de Madrid, I am developing an independent, multidisciplinary line of research focused on wearable medical devices and continuous sensors for imaging and organ-on-chip systems, funded through three projects in which I am PI/co-PI. To carry out these projects, I draw on my combined experience in applied physics, engineering and data analysis, and on my ability to build research teams and lead interdisciplinary efforts. My goal is to consolidate this line of research, creating minimally invasive, affordable and sustainable sensors for monitoring physiological variables and biomarkers in real-world settings.

Throughout my career I have obtained competitive support at all stages (including PhD and MIT postdoctoral fellowships) and contributed to the financial strength of my groups by proposing ideas that led to funded grants, culminating in my current role as PI. My work has been published in 37 articles (15 first author, 6 corresponding author) and one book on electronic fluctuations in spintronics. I have presented 28 communications at conferences (including 4 invited talks), helped organize two scientific meetings, delivered 4 seminars, and participated in outreach events. I review for AIP, Nature, Optica, IEEE journals and maintain an active network of international collaborators, including service as an ECR coordinator for a Una Europa Seed funding initiative.

Despite the diversity of my projects, my research is consistently guided by innovation, technological relevance and translation to real-world applications. This has resulted in seven patents (two licensed by 3M), covering optical positioning devices, hybrid Josephson junctions, portable oxygen and CO₂ sensors, and a system to extend tissue viability for transplants; collaborations with companies such as 3M, Procter & Gamble, PerkinElmer and BD; and leadership of clinical trials using the developed oxygenation sensors.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My interest in teaching includes undergraduate Physics at UAM and UCM, formal pedagogical training, and mentoring technicians, summer students, and BSc (3), MSc (2) and PhD students. I am currently supervising my first two PhD students and have extensive experience interviewing, selecting and hiring scientists and engineers.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: LECONTE LECONTE, NICOLAS
Referencia: RYC2025-055674-I
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Título: Beyond Flat Bands: Correlated States in Moiré and Supermoiré Systems (MOSAICS)

Resumen de la Memoria:

My research trajectory focuses on understanding and controlling interaction-driven phases in moiré quantum materials, with a particular emphasis on twisted graphene and graphene/hBN systems. After a PhD on multiscale transport in disordered graphene, I developed real-space methods for Hall conductivity at ICN2 Barcelona and deepened my expertise in moiré electronic structure during a BAEF fellowship in A. MacDonald's group at UT Austin. Over the last seven years as a Research Professor (equivalent to senior postdoc in Spain) in Seoul, I have led the development of large-scale relaxation and tight-binding tools that are now widely used in the moiré community, and I have co-led several high-impact experimental-theoretical collaborations on magic-angle graphene, alternating-twist multilayers, and pressure-tunable moiré superlattices.

These efforts culminated in my recent role as last/corresponding author on the first experimental-theoretical observation of a fractional Chern insulator in a dispersive miniband of monolayer graphene on hBN. In this work, I proposed a mechanism in which magnetic-field-induced Berry-curvature redistribution and open orbits stabilize correlated phases well beyond the flat-band limit. This result motivates the central idea of my future research: flatness is not a prerequisite for strong correlation in moiré systems; instead, stacking geometry, lattice relaxation and commensuration can reshape minibands and Berry curvature in ways that enable interaction-driven topological phases in both flat and dispersive regimes.

The line of research I propose as a Ramón y Cajal fellow is to build a general real-space framework for miniband engineering in multilayer moiré and supermoiré systems, including helically twisted and alternating-twist architectures and 2.5D multilayer graphite. The project has four main objectives: (O1) to construct commensurate and quasi-commensurate geometries and stacking textures for complex multilayers; (O2) to develop a multiscale pipeline combining atomistic relaxation, tight-binding, and semiclassical/topological diagnostics to map miniband topology and Berry curvature; (O3) to identify fractional Chern insulators, excitonic insulators and topological boundary modes via Hartree-Fock and exact diagonalization; and (O4) to release open-source geometry engines, stacking maps and miniband datasets for the community.

This program transforms my previous system-specific contributions into a coherent, independent research agenda aimed at uncovering general organizing principles of stacking, topology and correlation across a broad family of moiré materials. It is fully complementary to the strengths of the host group in ab-initio and code integration (MaX consortium) and to Spanish expertise in many-body real-space methods. By anchoring a dedicated moiré-focused activity and providing open tools that connect theory to experiment, the proposed line will position the host institution as a reference center for real-space modeling of correlated and topological phases in moiré and supermoiré systems.

Resumen del Currículum Vitae:

Within Prof. Jung's group, I serve as the most experienced postdoctoral researcher, a role formally recognized in Korea as "Research Professor" (PI). Over time, my responsibilities have expanded significantly. I provide daily mentorship to PhD students, master's students, and junior postdocs, who typically consult me before escalating issues to Prof. Jung. This structure has improved workflows and fostered a collaborative, high-performing environment. I directly supervise students such as Jiaqi An (PhD defended in December 2022), Srivani Javvaji (Fall 2024), and Youngju Park (June 2025).

After completing a 5-year KRF postdoctoral fellowship, awarded to attract top-tier foreign researchers, Prof. Jung made substantial efforts to retain me. More recently, I was tasked with coordinating and revitalizing several collaborative projects with experimental groups where progress had stalled due to communication bottlenecks. My leadership helped re-establish priorities, clarify deliverables, and realign theory with experimental needs. My scientific work focuses on real-space modeling of moiré superlattices, especially twisted bilayer and multilayer graphene. I study strain-induced pseudomagnetic fields, stacking-dependent energetics, and symmetry-driven miniband formation. These phenomena are often inaccessible to continuum models and require atomistic approaches to connect to STM, nanoARPES, and transport signatures. I frequently lead simulation efforts even when not listed as first author. This work earned me the University of Seoul's Excellent Research Output Award (2022-2024), which includes a monthly 10% salary bonus.

I have served as Principal Investigator or collaborator on several competitive research grants:

- PI: NRF Korea Grant 2018R1C1B6004437 (~110,000\$, 2018-2020), funding Jiaqi An's MSc;
- PI: NRF Korea Grant RS-2023-00249414 (~100,000\$, 2023-2025), supporting two PhD students;
- PI: KISTI Supercomputing Award (21 million CPU hours, 2019-2020), for large-scale simulations;- I contributed to a 1M\$ NRF grant (2016-2021) on magnetic moiré materials (PI: J. Jung).
- Collaborator on PID2023-146461NB-I00 from the Ministerio de Ciencia, innovación y Universidades;

In 2024, I ranked second in a national competition for a permanent research position at CSIC, reflecting strong evaluations of my research leadership and international profile. My work in moiré physics, topological bands, and quantum transport demonstrates the ability to conceive, fund, and execute high-impact theoretical research.

Beyond research, I actively contribute to academic service and community-building. I co-organized the Twistronics 2023 Workshop with Profs. Jung and Guinea, which brought together leading figures in the field and included practical software tutorials. Despite Korea's strict COVID-19 travel restrictions, I maintained an international presence through invited virtual talks. I was invited to chair a session at the APS March Meeting and attended the Aspen School of Physics.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

I also engage in public outreach and mentorship. I introduced the scientific profession to students at a Korean school and run a public science forum that promotes respectful, evidence-based dialogue.

An extended, polished and up to date version of my CV can be found here: <https://www.overleaf.com/read/nqmhjdjsjhcc#c062e1>



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: PEDRAZA AVELLA, JUAN FELIPE
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Título: Quantum aspects of gravity, black holes and holography

Resumen de la Memoria:

Over the last decade, my research line, "Quantum aspects of gravity, black holes and holography", has focused on how quantum information and strongly coupled quantum field theories control the structure and dynamics of spacetime, from black-hole horizons to cosmological singularities. Using gauge/gravity duality as the main tool, my work is structured around three closely related themes.

First, I have studied gravitational entropy and the emergence of geometry from entanglement. My work on holographic entanglement entropy and bit threads clarifies how information flows in quantum many-body systems are encoded in higher-dimensional minimal surfaces and flow networks, and provides concrete tools to analyze multipartite entanglement, coarse-graining and entanglement wedge reconstruction. This line of research connects early work on holographic entanglement to more recent contributions on holographic complexity. Building on the bit-thread picture, I introduced Lorentzian threads as "gatelines" that reinterpret flows in terms of quantum circuits and causal structure in the bulk, offering a dynamical viewpoint on how spacetime can be built from quantum degrees of freedom.

Second, I have worked on black-hole thermodynamics beyond the purely classical regime. In AdS, dS and asymptotically flat settings, I have explored extended black-hole thermodynamics and shown how pressure-volume terms enrich the phase structure of black holes and black branes. More recently, I have derived quantum generalizations of geometric inequalities for black holes, establishing bounds that remain valid once semiclassical backreaction and quantum matter fields are included. These results shed light on how the area theorem and forms of cosmic censorship are modified for "quantum black holes", and they feed directly into my current and proposed work on quantum backreaction near spacetime singularities in both black-hole and cosmological contexts.

Third, I have used holography to characterize chaotic properties, transport, and far-from-equilibrium dynamics in strongly coupled quantum field theories. This includes introducing string-theoretic probes of chaos in AdS black holes, with applications to the quark-gluon plasma and the physics of heavy-ion collisions. More recently, I have also studied Krylov complexity, out-of-time-order correlators, and related diagnostics of scrambling and operator growth in holographic systems. Together with my contributions to braneworld and double-holographic constructions, these studies provide new probes of black-hole dynamics and of the interplay between quantum information, quantum chaos, and gravity.

Across these directions, I have developed a recognized research profile at the interface of quantum information and gravity, often in collaboration with leading international groups and within large-scale programs such as the Simons "It from Qubit" collaboration. At IFT UAM/CSIC I now lead a young group that uses these ideas to address fundamental questions about the microscopic foundations of black holes and gravitational settings.

Resumen del Currículum Vitae:

I am a highly accomplished theoretical physicist working at the interface of quantum gravity, holography and quantum information. After earning my BSc in Physics from the Universidad Industrial de Santander (2008) and an MSc from the Universidad Nacional Autónoma de México (2010, CONACyT fellow), I obtained my PhD from The University of Texas at Austin (2015), where I received the Robert N. Little Graduate Fellowship and a Dean's Excellence Fellowship. I subsequently held postdoctoral positions at the University of Amsterdam as an NWO-VENI fellow, at University College London and Brandeis University as a Simons "It from Qubit" fellow, and at the University of Barcelona as a "la Caixa" Junior Leader fellow. Since 2022 I am a researcher at the Instituto de Física Teórica IFT UAM/CSIC, Madrid, supported by a five-year "Atracción de Talento" starting grant (from the Comunidad de Madrid) and leading a young research group.

My research focuses on gauge/gravity duality, quantum black holes, cosmology and strongly coupled quantum field theories, with a sustained emphasis on quantum-information-theoretic aspects of gravity. I have authored 94 research papers (46 in the last five years), with 3170 citations and an h-index of 36. My work appears in top journals, including 5 articles in Physical Review Letters (one as an Editors' Suggestion), 47 in the Journal of High Energy Physics, and numerous contributions to PRD, MNRAS, EPJC, CQG and related leading venues. These publications, co-authored with nearly 100 collaborators worldwide, reflect both scientific impact and strong international integration.

I have secured competitive funding at every career stage: national graduate fellowships in Mexico and the USA, the personal VENI grant in the Netherlands, the Simons "It from Qubit" fellowship in the USA/UK, the "la Caixa" Junior Leader fellowship in Spain, and my current "Atracción de Talento" project, as well as participation in several Spanish national research grants as part of a team. In 2025 I obtained the R3 certificate from the Spanish State Research Agency, formally recognizing me as an established independent researcher.

I play an active role in shaping the field through community building, mentoring and outreach. I have organized seven international workshops and conferences, delivered more than sixty invited talks and plenary lectures worldwide, and my results have been featured in outlets such as Phys.org, The Conversation and Quanta Magazine. I have supervised six Master's theses, currently supervise two PhD students and have worked with three postdoctoral researchers, helping them develop independent research profiles and international networks. I have taught both undergraduate and advanced graduate courses in physics. I serve as editor of Entropy (section "Astrophysics, Cosmology and Black Holes"), as guest editor of special issues, and as a regular referee and reviewer for leading journals and funding agencies.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

Looking ahead, my goal is to consolidate a visible research hub at IFT that connects quantum information and quantum gravity, while continuing to train and support the next generation of researchers.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: COSTANTIN, LUCA
Referencia: RYC2025-056493-I
Correo Electrónico: lcostantin@cab.inta-csic.es
Título: SEEK-Gal: Structural Evolution and Early Kinematics of Galaxies

Resumen de la Memoria:

My main research field is the formation and evolution of galaxies. I am an expert in the treatment and analysis of diverse datasets from cutting-edge facilities, both ground-based (including the Gran Telescopio Canarias, the largest optical telescope in the world) and space-based (most notably JWST, the most powerful observatory ever built). My work spans observations from multiple large surveys as well as state-of-the-art cosmological simulations, allowing me to bridge theoretical modeling and observational astrophysics.

My extensive international mobility including more than nine months across seven countries and prestigious research institutes has enabled me to build a broad, long-standing network of collaborators. I am an active member of 19 international teams and lead four working groups. I am deeply involved in the scientific exploitation of JWST data, contributing to two JWST survey teams and seven GO open-time programs, with 71 publications generated since the first JWST data release in June 2022. I have privileged access to data from several approved JWST programs and hold leading roles in multiple international collaborations, being recognized as one of the world's top experts in MIRI and NIRCам data calibration.

This career trajectory has resulted in an outstanding and steadily increasing scientific output (102 refereed Q1 publications, including 10 first-author papers and one first-author Nature manuscript), along with 29 oral conference contributions (5 invited), PI roles in research projects funded for more than 2M€, several successful observing proposals, the mentoring of 17 students, refereeing for four journals, and participation in international scientific committees. I am therefore in a privileged position to continue advancing my research program and to capitalize on the scientific revolution now underway.

In the coming years, I will focus on addressing a central question that has driven both observational and theoretical astrophysics for decades: how has the Universe evolved into the structure we observe today? SEEK-Gal (Structural Evolution and Early Kinematics of Galaxies) is designed to bridge theoretical and observational astrophysics by employing both classical methods and deep learning to classify and study the structure of millions of galaxies in simulations and observations. The project will exploit the unmatched capabilities of JWST's MIRI, NIRCам, and NIRSpec instruments to investigate key open questions in galaxy formation and evolution. Its unique and innovative approach, including the development of deep learning tools that can also be applied to the study of cancer cell morphology, creates a powerful interdisciplinary synergy.

Resumen del Currículum Vitae:

My main research field is the formation and evolution of galaxies. I have a strong record of excellence across several leading research centers. I was awarded a competitive Ph.D. position at the University of Padova (50,000€; 2014-2018; Doctor Europaeus distinction), followed by a postdoctoral position at the National Institute of Astrophysics in Milan (2018-2019) and the competitive Atracción de Talento fellowship at the Astrobiology Center in Madrid (80k€; 2019-2023). In 2023, I got a postdoctoral position within the MIRI European Consortium of the James Webb Space Telescope (JWST). In 2024, I was awarded both the competitive Atracción de Talento César Nombela fellowship (400k€; declined) and the LaCaixa Junior Leader fellowship (300k€; 4% success rate), enabling me to consolidate my research team and line of research at the Astrobiology Center.

In 2024, I obtained the R3 certificate as an Established Researcher, confirming the quality, independence, and leadership demonstrated throughout my career. As a milestone, I have attracted more than 2 million euros in competitive funding as Principal Investigator. I am PI or Co-I on more than 30 awarded observational proposals, totaling more than 2,000 hours of telescope time across ground- and space-based facilities. I am currently part of 19 international teams and lead four working groups. Notably, I am leading the calibration of JWST datasets within the MIRI European Consortium and several JWST-GO teams.

I have authored 102 refereed Q1 publications (10 as first author, including a first-author Nature manuscript). My H-index is 37. I have delivered 29 oral presentations (5 invited) at national and international events, and my work has been presented in 7 invited seminars/colloquia.

I have undertaken 11 research stays in seven different countries (>9 months), further strengthening my international profile. I currently serve as a reviewer for the Swiss National Science Foundation, an Expert Panel Member for the European Southern Observatory, and a board member of the Equality Committee of the Astrobiology Center. Among others, I have served as a reviewer for the State Research Agency (AEI) and as a member of a Ph.D. Examination Committee. I have actively organized and participated in JWST-related workshops in Germany, Belgium, Sweden, Scotland, and Spain. I regularly referee for AJ, ApJ, A&A, and MNRAS.

I have mentored 17 students at various stages of their academic careers. I currently supervise a Marie Skłodowska-Curie Ph.D. fellow (defense: 15.12.2025) and 2 M.Sc. students, and I have previously supervised 7 M.Sc., 6 B.Sc., and 1 internship student. I was invited as a tutor to the international NEON Observing School in 2018 and 2025, contributing over 150h of training to Ph.D. candidates. During my Ph.D., I served as a teaching assistant for Astronomy 1 and Physics Laboratory courses at the University of Padova (60h).

I am also deeply committed to outreach activities, participating in events such as the European Researchers' Night, the Week of Science, and Pint of Science. I have been featured on several radio programs and participated in a Netflix docuseries. Since 2017, I have contributed to more than 30



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

international press and media releases. Since 2024, I have served as the scientific advisor for the art exhibition "Ecos del Cosmos: Galaxias Ancestrales Reveladas".



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: STANCAMPIANO, AUGUSTO
Referencia: RYC2025-054536-I
Correo Electrónico: augusto.stancampiano@gmail.com
Título: Cold Plasma Aerosol Technology for Agri-Food and Biomedical Applications
Resumen de la Memoria:

Dr. Augusto Stancampiano is a CNRS Full Researcher whose work spans cold atmospheric plasma (ionized gas) and its applications in agriculture, biomedicine, and plasma-liquid systems. He has advanced the understanding of plasma interactions with liquids, aerosols, skin and seeds, establishing him as a key contributor to plasma-aerosol technologies. Since 2021, he has developed an independent research line focused on plasma interactions with water droplets in sprays and aerosols, bridging fundamental plasma physics with high-impact applications. His leadership includes principal investigator roles in the ANR-funded PLASMASOL project and co-PI positions in agricultural (SPEED) and biomedical (PlasmaACT) initiatives.

Drawing on this expertise in plasma-liquid interactions, Dr. Stancampiano focuses on plasma-aerosol technology, an emerging approach that couples cold plasma with water microdroplets to overcome the size and efficiency limitations of conventional plasma sources. Cold plasma is a partially ionized, reactive state of matter that can be generated at low temperatures ($<40\text{--}8239^\circ\text{C}$), enabling safe interaction with biological materials. This technology is increasingly recognized for its potential to mitigate environmental pollution, offer novel biomedical treatments, and enhance food safety and agricultural productivity. Conventional plasma sources, however, remain limited in scalability and efficiency. Coupling plasma with water offers a promising route to overcome these limitations, as plasma-water interactions generate short-lived reactive species ($\cdot\text{O}$, $\cdot\text{OH}$, $\text{H}\&\#8322;\text{O}\&\#8322;$, $\text{O}\&\#8322;$, $\text{NO}\&\#8322;$) relevant for oxidation and nitrogen-fixation processes. However, classical batch reactors suffer from poor plasma-to-liquid transfer, limiting industrial translation.

Plasma-aerosol systems constitute an innovative alternative: water microdroplets act as microreactors with extremely high surface-to-volume ratios, enabling retention of ultrashort-lived species normally lost in bulk liquids. Plasma can thus chemically and physically tailor droplets for targeted delivery to food products, skin, or plants. Recent studies show the potential of plasma-aerosols, yet controlling such coupled systems remains highly challenging, as it requires precise tuning of droplet production, plasma generation, energy deposition, and interaction time.

A particularly promising configuration is the needle-to-ring transient-spark electrospray system, which allows fine control over plasma power, droplet production, and interaction time, enabling selective generation of oxidative or nitrogen-based species. The proposed research aims to advance the field by:

- ▣ Establishing quantitative correlations between operational parameters and reactive species in both liquid and gas phases
- ▣ Integrating AI-assisted optimization for rapid and precise tuning of plasma-aerosol processes
- ▣ Expanding applications to food and equipment decontamination and nutrient misting for aeroponic cultivation

This line of research is sustainable, chemical-free, and deployable in situ, directly supporting the EU Farm-to-Fork strategy and addressing challenges in food safety, agriculture, and biomedical applications. Dr. Stancampiano's extensive experience in plasma physics, plasma-liquid systems, and AI integration ensures both scientific innovation and practical translation of this technology.

Resumen del Currículum Vitae:

Dr Augusto Stancampiano is a CNRS Full Researcher whose work focuses on cold atmospheric plasma and its applications in agriculture, biomedicine, and plasma-liquid systems. His research has significantly advanced the fundamental understanding of plasma interactions with liquids, aerosols, skin, and seeds, establishing him as a key contributor to the emerging field of plasma-aerosol technologies. Since 2021 at the GREMI laboratory, he has developed an independent research line centered on plasma interacting with water droplets in sprays and aerosols, bridging fundamental plasma physics with high-impact applications.

He is Principal Investigator of the ANR-funded PLASMASOL project, dedicated to plasma-aerosol interactions. Results from this program, combined with partnerships with industrial and agricultural stakeholders, underpin the SPEED project, which aims to transfer cold-plasma seed-priming technology to the agricultural sector; within this consortium he serves as Co-PI and leads the development of plasma and spray systems. His work also extends to biomedical innovation: in collaboration with the University of California and the CNRS Centre de Biophysique Moléculaire, he is co-inventor of a patent-pending AI-plasma technology for real-time, non-destructive tissue classification and cancer detection. This effort is supported by the PIATUC project, where he is Co-PI and leader of the plasma-AI component, and by CNRS seed funding (DETECT-P) preparing a European EIC Pathfinder proposal.

Dr Stancampiano is Co-PI of the EU MSCA Doctoral Network PlasmaACT, dedicated to plasma multijet treatments for Actinic Keratosis, involving leading European plasma and medical institutes. He co-supervises two PhD candidates and oversees the development and diagnostics of multijet plasma systems. His expertise has contributed to additional funded initiatives, including PLANES, which demonstrated the operation and antimicrobial action of plasma jets in microgravity, and MINIONS, which developed plasma-treated sprays for transient modulation of skin permeability.

He has co-supervised five PhD students, two post-doctoral researchers, and numerous Master and undergraduate trainees, and contributes to teaching at Polytech Orléans and the University of Bologna. He is an elected member of the GREMI management committee (since 2024), Associate Editor of IEEE Transactions on Radiation and Plasma Medical Sciences, and reviewer for over 20 journals. He also evaluates projects for major scientific agencies, including the DFG, NWO, Serbian Academy of Sciences, Czech Academy of Sciences, and Latvian Council of Science.

His international visibility is supported by 43 peer-reviewed publications (h-index 23), four patent filings, and invited or plenary talks at major international conferences. He has contributed to European networking through COST Actions, notably PLAGRI, where he served as Vice-Scientific and Communication Manager and national representative. His scientific achievements have been recognized by major distinctions, including the 2025 CNRS Cristal Collectif Award, the 2024 Early Career Award in Plasma Medicine, and the 2019 Young Investigator Award of the International Plasma Chemistry Society.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: RODRIGUEZ GARCIA, LAURA
Referencia: RYC2025-055556-I
Correo Electrónico: lau.rod.gar@gmail.com
Título: Partículas energéticas solares

Resumen de la Memoria:

Although energetic particles are pervasive throughout the universe, the details of their acceleration—its timing, location, and underlying mechanisms—remain incompletely understood. Solar energetic particles (SEPs), owing to their proximity and the wealth of available in situ and remote-sensing observations, provide an unparalleled natural laboratory for investigating these fundamental processes. At the same time, resolving the origins and acceleration pathways of SEPs has become increasingly urgent, as they are a major driver of space-weather hazards.

Eruptive solar activity—comprising solar flares and coronal mass ejections (CMEs)—is the primary engine of solar–terrestrial interactions and shapes planetary environments across the heliosphere. Flares manifest as sudden enhancements across the electromagnetic spectrum, while CMEs expel large volumes of magnetized plasma into interplanetary space. When CMEs are sufficiently fast, they can generate shock waves in the corona and heliosphere, capable of accelerating protons to several GeV and electrons to hundreds of MeV. Despite decades of research, however, disentangling the relative roles of flare-associated processes and CME-driven shocks in producing SEPs remains one of the central open questions in Heliophysics.

A key focus of my work has been the study of gradual SEP events, which often extend over remarkably wide longitudinal ranges. These events are particularly hazardous because they allow highly energetic, strongly ionizing particles (protons >100 MeV) to traverse vast heliospheric distances, ultimately reaching Earth, the Moon, and Mars. Their characterization is therefore fundamental for evaluating how radiation risks are distributed throughout the heliosphere.

Through extensive statistical analyses, I have quantified how core SEP parameters vary with heliocentric distance, identifying an approximate R^{-3} dependence. This scaling provides valuable constraints for particle-transport models: knowing the particle energy at one location enables a quantitative estimate of radiation levels elsewhere. Such predictive capability is crucial for informing mitigation strategies that protect both astronauts and technological systems during space operations.

A distinctive characteristic of my research trajectory is the systematic integration of data from both solar and planetary missions. By exploiting the complementarity of these datasets, my work promotes a genuinely multidisciplinary perspective on heliospheric physics and strengthens connections between scientific communities that have traditionally operated independently. This combined approach has proven especially powerful for advancing our understanding of energetic particle propagation across the solar system, opening new avenues for innovation in space-weather science.

Space weather is an increasingly critical discipline as space agencies move toward sustained human exploration of the Moon and Mars. In this context, improving our ability to characterize and predict SEP-driven radiation environments is essential for ensuring the safety and resilience of future crewed missions.

Resumen del Currículum Vitae:

I am an Independent Research Fellow at the European Space Agency (ESA), a highly competitive position (5% success rate), where I lead independent research in Heliophysics with a focus on Solar Energetic Particles (SEPs) and Coronal Mass Ejections (CMEs). My trajectory combines scientific excellence, international leadership, and a solid background in the aerospace industry.

I have published over 20 peer-reviewed Q1 journal articles (H-index 12, 458 citations), including six first-author papers. My work is internationally recognized for advancing our understanding of the spatial distribution and acceleration of SEPs. One of my most influential studies showed, through detailed particle-timing analysis, that a major widespread SEP event had no flare contribution, a result that has already received 24 citations. A key conclusion of my research is that the strongest imprint of the solar source on early-accelerated particles occurs very close to the Sun, within 10 solar radii.

My research is strongly embedded in international collaborations, involving institutions such as NASA Goddard, KU Leuven, Kiel University, University of Lisbon, Predictive Science, Johns Hopkins APL, and University College London. I contribute to several major space missions—Solar Orbiter, BepiColombo, and JUICE—and in 2025 I was appointed Co-Investigator of the Solar Orbiter EPD instrument, reflecting my scientific leadership. I served as main convener of the Solar Orbiter sessions at EGU 2024 and 2025, and I am a member of the Science Organizing Committee of Solar Wind 17.

I have been selected for multiple high-impact international panels, including being appointed by ESA (2025) to the expert group defining radiation conditions for future human and robotic exploration of the Moon and Mars. Since June 2025, I co-lead a 12-member ISSI international team on Space Weather at Mars. I was also selected by ESA (2025) to review RADEM radiation-monitor data from the JUICE mission, and I previously served as an invited member of the NASA Heliophysics MDEX Science Panel (2021). My expertise is further recognized through frequent invitations to review for leading journals such as The Astrophysical Journal, ApJL, Astronomy & Astrophysics, Earth, Planets and Space, and JASTP.

My career path also includes significant engagement in scientific outreach, mentoring, and education. I received the First Prize in Basic Science of the Margarita Salas Award 2025, have been interviewed by RTVE and ESA, and have been invited to speak at major public events, including the National Congress of Physics Students (CONEF 2025). As part of the Space Research Group (University of Alcalá), I co-organized COSMOS_UAH and contributed to Science Week activities.

In supervision, I currently co-supervise one PhD student and two Master's students, all preparing first-author manuscripts for submission to Astronomy & Astrophysics and presenting their work at major international conferences, demonstrating my growing leadership in training early-career researchers.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: HIRTHE, SARAH
Referencia: RYC2025-055113-I
Correo Electrónico: sarah.hirthe@icfo.eu
Título: Quantum simulation with atoms and photons

Resumen de la Memoria:

Quantum simulation has become a key route to exploring interacting many-body systems and collective phenomena that are often difficult to study in traditional condensed-matter settings. As the field expands, technological developments and innovative strategies are opening access to new regimes of collective behavior, topology, and strong correlations. My research program will combine my experience in ultracold atoms with the development of complementary platforms that offer compact architectures and faster experimental cycles. This approach will allow me to address challenging scientific questions in new contexts.

As one of my research directions, I will explore quantum fluids of light in hot atomic vapors. In these systems, photons acquire effective interactions through the nonlinearity in optical media such as hot atomic vapor. The resulting photon fluid displays many hallmarks known from ultracold Bose-Einstein condensates, such as superfluid hydrodynamics, vortex formation and long-range coherence. While existing work has largely relied on rubidium vapor, I will investigate cesium vapor and potassium vapor, whose level structures enable different nonlinearities and dispersion regimes. With this, I aim to study regimes where competing attractive and repulsive interactions lead to exotic superfluid phenomena. A main goal of my research will be to reach the beyond mean-field regime. My knowledge on superfluidity will allow me to carry over many concepts from ultracold atoms to quantum fluids of light. I will accelerate the progress on this platform for quantum simulation and enable observations that have so far only been accessible in cold quantum gases.

As a second direction I will focus on ultracold atoms in tunnel-coupled optical tweezer arrays. Ultracold atoms provide unmatched control and tunability over quantum many body systems, but conventional lattice experiments have long cycle times and substantial complexity. Optical tweezer arrays offer faster operation and flexible geometries but typically lack tunnel coupling. I will develop a new experiment that combines the advantages of tweezer platforms with large, tunnel-coupled arrays. My goal is to scale such systems to hundreds of atoms while achieving extremely low entropies. To this end I will explore preparation protocols and cooling techniques in optical tweezers experimentally, and in theoretical collaborations. I will then use this platform for the realization of fermionic Hubbard models. With precise control over the depth and position of each tweezer, the platform will enable the engineering of controlled defects and the study of geometries beyond the square lattice, including frustrated lattices and higher-band configurations relevant to high-temperature superconductivity.

Resumen del Currículum Vitae:

I am an experimental physicist working on quantum science and technology at the interface between atomic physics, quantum optics and condensed matter. My research concerns quantum simulation of quantum-many body effects with ultracold neutral atoms, with major results on the simulation of strongly correlated electrons and the dynamics in a supersolid phase of matter

I studied physics at the Ruprecht-Karls University of Heidelberg and Ludwig-Maximilians University (LMU) in Munich. After a one-year master thesis project at the Max-Planck Institute of Quantum Optics (MPQ) with Dr. Christian Gross (now Professor in Tübingen University) under the supervision of Prof. Immanuel Bloch (LMU/MPQ), I decided to pursue a PhD with Prof. Immanuel Bloch.

The core of my PhD research was the quantum simulation of the Fermi-Hubbard model, a solid state model describing strongly correlated electrons which is conjectured to capture the essential physics of high-temperature superconductivity. To this end, I worked with ultracold lithium atoms in optical lattices imaged using a quantum-gas microscope. Amongst my results are the observation of magnetically mediated hole pairing and the realization of a symmetry-protected topological state. I also upgraded the experimental apparatus, such as implementing optical superlattices and developing a novel technique for single-site spin and charge resolution of the quantum system. My work led to 6 scientific publications, amongst them 3 publications in Nature (one first author and one shared-first author), 2 publications in Science and one publication in Physical Review Letters. My first-author publication was selected for a Nature research briefing, and my PhD thesis reached the finals of the German Quantum Future Award.

In 2023 I moved to the "Ultracold Quantum Gases" group (ICFO), led by Prof. Leticia Tarruell. Since 2024 I have been a Marie Skłodowska-Curie postdoctoral fellow in the group. Here, I have worked on the realization of a supersolid phase of matter in spin-orbit coupled BECs. Our characterization of the dynamics of this phase has led to manuscript which is accepted for publication at Science (shared-first author). Early public demonstrations of our data attracted great interest, reflected for example in a poster prize I got awarded in the international conference on atomic physics (ICAP 2024). Overall, my scientific publications in peer-reviewed journals have received 800 citations (Google Scholar), and I have been invited to speak at 6 international conferences, 7 seminars and 1 colloquium. I have furthermore contributed to numerous international conferences with contributed talks and posters. I have taught as a teaching assistant giving tutorials in 4 semester courses, I have given guest and substitution lectures at three Barcelona Universities (UB, UAB and UPC) and I have supervised 7 internship students. I have been invited to speak on 2 research schools.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: TORRENTÍ SALOM, FRANCISCO
Referencia: RYC2025-054218-I
Correo Electrónico: f.torrenti@uv.es
Título: New Frontiers in Lattice Cosmology

Resumen de la Memoria:

My research lies at the intersection of cosmology and fundamental physics. My objective is to advance our understanding of the early universe, its connection to particle physics and its observational signatures. I am also a leading expert in numerical simulations of the early universe, with several high-impact publications in the field. In that regard, I am a creator and main developer of CosmoLattice: a parallelized code for real-time lattice simulations of field theories in an expanding universe, used in more than 80 publications by different research groups since its public release in 2021.

RESEARCH: In addition to my role in CosmoLattice, during my career I have made other important contributions to early universe research. My work has helped clarify the “primordial dark age” of the universe—the intermediate stage between inflation and nucleosynthesis—by characterizing its non-linear dynamics and its observational signatures. Relevant contributions include:

- Parametric studies of stochastic gravitational wave backgrounds produced by early-universe sources, including cosmic domain walls (JCAP²⁵), oscillons (JCAP²⁵), and preheating (JCAP¹⁷). These studies identify the characteristic spectral features associated with each phenomenon, explore their dependence on model parameters, and examine their potential relevance for present and future GW observatories.
- A detailed characterization of the long-term evolution of the equation of state and the energy distribution during reheating, including how the universe transitions from inflation to radiation domination, and the impact of such stage in the theoretical determination of inflationary CMB observables (e.g. PLB²⁰, PRD²², JCAP²⁵).
- Numerical studies of out-of-equilibrium processes after inflation, including parametric analyses of preheating (JCAP¹⁷) and oscillons (JCAP²⁵) in well-motivated models of inflation.
- Studies of the dynamics of the Standard Model Higgs in the early universe with gauge-invariant lattice techniques, including a comprehensive study of the Higgs decay after inflation (PRD¹⁵), and the implications of a non-minimal Higgs-curvature coupling for post-inflationary vacuum stability (PRD¹⁸).

Another of my research lines focuses on quantum field theory in curved spacetime and its application to cosmology. My contributions include:

- The formulation of an adiabatic regularization method for fermion fields in an expanding universe, including both free fermions (PRD¹³, PRD¹⁴) and fermions coupled to background scalar fields via Yukawa interactions (PRD¹⁷).
- The development of a new regularization method in cosmological spacetimes without infrared distortions and its application to inflation (PLB²², PRD²³).

Resumen del Currículum Vitae:

POSITIONS: I completed my PhD at the IFT (UAM/CSIC) with a Severo Ochoa fellowship (2014¹⁸), including research stays at CERN (04⁰⁸/2015), Imperial College (04⁰⁷/2016), and EPFL (09¹²/2017) with support from various national mobility grants. Afterwards, I was a postdoc at the University of Basel (2018²²) with partial support from the university’s competitive research funds for “excellent junior researchers”. I then returned to Spain with a María Zambrano fellowship for the attraction of international talent (2022-24), hosted by IFIC’s gravitation group (this period includes a career break due to a paternity leave). Since 04/24 I am a Beatriu de Pinós research fellow at the University of Barcelona. This trajectory has allowed me to develop a broad international network of scientific collaborators.

RESEARCH: My scientific output comprises 22 publications in Q1 journals such as Phys. Rev. D, JCAP, and Phys. Lett. B, one preprint and two proceedings. My work has received +1500 citations in total (source: INSPIRE-HEP) and includes four articles with +100 citations and eleven with +50 citations. All except one have been written by small teams of up to four authors, which underscores the significance of my contributions. I have also been an invited speaker at various workshops in early universe physics.

I am a creator and main developer of CosmoLattice: a parallelized code for real-time lattice simulations of field theories, aimed at studying a wide range of non-linear phenomena in the early universe. Since its public release in 2021, it has been used in +80 publications authored by many different research groups. Furthermore, +180 researchers have participated in the CosmoLattice Schools aimed at teaching the code, held at Spain (2022), on-line (2023), and South Korea (2025). I am also part of the team currently developing CosmoLattice 2.0, which will significantly expand the range of physics models the code can simulate. The contents of such expansion were the topic of an invited review in the high-impact multidisciplinary physics journal Rep. Prog. Phys. (2024).

I am also a co-author of “The art of simulating the early Universe”, a pedagogical introduction to the field of lattice simulations (JCAP²⁰). I have also contributed to a highly cited review on gravitational waves at ultra-high frequencies (Living Rev. Rel.²¹).



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DE CIENCIA, INNOVACIÓN
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

TEACHING: I have lectured at five international PhD schools in the last years, including YETI 2022: Phenomenology in the sky (Durham U., UK) and various editions of the CosmoLattice School. I have also supervised six master's students on different early universe topics, as well as been the day-to-day supervisor of one PhD student at Basel. I have also taught official courses at both undergraduate and postgraduate levels. At Basel, I was the main lecturer of the official MSc course "Theoretical Cosmology", which I prepared from scratch and taught in 2019 and 2021 (30h/year). At Valencia, I was the theory lecturer of the first-year physics course on multivariate calculus in 2023 and 2024 (45h/year), a teaching role of high responsibility. I have also given lectures on highly specialized courses such as Quantum Field Theory and Astrophysics & Cosmology (see below). In 2025 I obtained the "profesor titular" certification from Spain's ANECA.

OTHERS: I have served as a referee for nine JCR physics journals.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: ACEBRON MUÑOZ, ANA
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Correo Electrónico: anaacebronmunoz@gmail.com
Título: Strong lens galaxy clusters as powerful cosmological probes

Resumen de la Memoria:

Throughout my career, I have gained a strong experience in the strong lensing modelling of complex simulated, and observed, galaxy clusters and the understanding of systematic uncertainties associated with current modelling techniques. I have acquired a unique research profile, by mastering three state-of-the-art strong lens modelling softwares and I have acquired some unique expertise in the application of cluster strong lens clusters as cosmological probes. The percent precision achieved on the measurement of the expansion rate of the Universe, defined by the Hubble Constant (H_0), has revealed some tension between estimates from local and early-Universe cosmological probes. The best strategy forward is then to explore complementary and independent techniques.

During my Ph.D. at the Laboratoire d'Astrophysique de Marseille from 2014 to 2017, I have gained vast experience in modelling strong gravitational lenses with the Lenstool parametric software. I actively participated in the evaluation of the precision of lens models with simulated clusters and the implications for the recovery of cosmological parameters, acquiring a unique expertise in the technique of strong lensing cosmography. I also participated in a joint lens community effort to compare the performance of various state-of-the-art modelling softwares. I acted as the liaison between our team, Cluster As Telescopes, whose code performed among the best, and the project leaders.

As a postdoctoral researcher at Ben Gurion University from 2017 to 2020, I extended my skills to the total mass modelling of observed galaxy clusters within the international collaboration RELICS (Reionization Lensing Cluster Survey) with a different mass modelling algorithm, Light-Traces-Mass (LTM), which has resulted in several publications. In addition, I have been involved in the characterisation of the properties of high redshift galaxies, lensed by clusters, and in spectroscopic follow-up observations (from the creation of the observational strategy and masks, to the final data reduction process).

In the last 4 years, I have been able to plan and implement my own research activities funded first by a Marie Curie and then by a Beatriz Galindo Junior Fellowship. I have also built an expertise in the exploitation of time-varying sources strongly-lensed sources to measure the values of the cosmological parameters, in particular that of the Hubble Constant. I have mastered two strong lens modelling software, GLEE and Gravity.jl, which allow for the modelling of the surface brightness distribution of lensed sources. While such analyses are common in the models of lens galaxies, this is the first time that it has been conducted in galaxy clusters, paving the way for a new generation of lens cluster models.

I have been and am actively involved in several large international collaborations exploiting HST and JWST data (e.g., Euclid, Rubin/LSST, RELICS, BUFFALO, GLASS-JWST-ERS) having the opportunity to extensively work with leading experts in the field while holding some responsibility roles. More recently, I am been interested in the novel idea of using Type Ia supernovae exploding in cluster member galaxies to enhance the precision of the time-delay cosmography technique.

Resumen del Currículum Vitae:

Degree in Fundamental Physics (2009-2012), Master in Astronomy and Astrophysics (2012-2014), Doctor in Astrophysics (2014-2017) from the University of Aix-Marseille, which I successfully defended on 25/09/2017. I currently am a Beatriz Galindo Junior Fellowship at the Instituto de Astrofísica de Cantabria, attached to the University of Cantabria (since 01/12/2023). Before:

- 01/01/2020 to 02/29/2022: Marie Curie Individual Fellow at the University of Milan
- 01/10/2020 to 29/02/2022: postdoc at the University of Milan, Italy
- 01/11/2017 to 30/09/2020: postdoc at Ben Gurion University of the Negev, Israel

I have demonstrated my ability to contribute to various areas within the field of strong gravitational lensing, resulting in 63 co-authored refereed publications since 2016, of which 9 articles as first author, with > 2371 citations and an h-index of 28. I have investigated a broad range of topics related to strong lensing in clusters of galaxies, from theoretical and observational perspectives. My research and expertise focus on studying their total mass distribution and probing the cosmic expansion rate and geometry. I have also shown that I am capable of attracting funding resources, in particular a Marie Curie Individual Fellowship Grant (2020, ~171 k€, ~14% success rate), and a Beatriz Galindo Junior Fellowship (2022, 200 k€) allowing me to plan my own research in the last 4 years.

I am a PI of 8 observational programmes (for a total of 91.8 h) at some of the most cutting-edge and competitive facilities, such as the Very Large Telescope, Gran Telescopio de Canarias, and the Nordic Optical Telescope, with success rates ranging from <35% to <16%, and Co-I of 10(4) successful observation proposals with HST(JWST) and 8 VLT programmes.

I am a core member of several large international collaborations, including Euclid, Rubin/LSST, J-PAS, JWST-VENUS, GLASS-JSWT-ERS, RELICS, and BUFFALO. In particular, I am co-coordinator of one of the Euclid DR1 Key Projects (DR1-SL-KP4) and have acted as co-chair of the "Mass Modeling" Working Group in the BUFFALO collaboration.

I have served as evaluator in the most relevant commissions and panels in my field, such as for the European Research Executive Agency (HORIZON-MSCA-PF-2024), JWST, HST, and ESO. I have been a member of 4 evaluation committees for Master and Bachelor defences. I am a regular referee for high-impact journals (A&A, MNRAS, ApJ, ApJL, and Nature Astronomy). I have co-supervised 5 Master students at UniMi and UC for ~10 months each,



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

and 1 Bachelor student at UC. I am a lecturer of "Extragalactic astrophysics" (MSc, 5th yr) and "Relativistic astrophysics" (BSc, 4th yr) and a teaching assistant of "Astronomy" (BSc, 3rd yr) at the University of Cantabria.

I have participated in over 40 international conferences or workshops with oral or poster contributions, of which 2 as an invited review talk and 8 invited talks at international conferences, and 10 seminars at several institutions. I have also led and helped organise several scientific meeting, serving as member of the scientific or local organising committee, or as the main organiser. Finally, I have contributed to the communication of scientific results, through interventions in radio programs, the creation of a YouTube channel for the BUFFALO collaboration, or the writing of internal press releases.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: KOLCHINSKY, ARTEMY
Referencia: RYC2025-055763-I
Correo Electrónico: artemyk@gmail.com
Título: Nonequilibrium thermodynamics and information processing in complex systems
Resumen de la Memoria:

In my research, I use nonequilibrium thermodynamics and information theory to study fundamental constraints on information processing. One of the guiding questions in my work is how energy and information flows limit the functional performance of complex systems, ranging from biomolecular machines and chemical reaction networks to machine-learning models.

My work on this topic began during my PhD at Indiana University (Bloomington, USA), where I developed information-theoretic tools for analyzing biological and neural networks. I then spent several years as a postdoctoral researcher at the Santa Fe Institute (USA) with David Wolpert, where I studied the thermodynamics of computation and developed techniques for estimation, decomposition and semantic measures of information, some of which have since been widely used in statistical physics, complex systems and machine learning. I continued my research on stochastic thermodynamics while spending a year as a visiting researcher at the University of Tokyo in the group of Sosuke Ito, a leading expert in the field. Since 2023 I have been a Marie Curie fellow at Universitat Pompeu Fabra (UPF) in Barcelona, working in the group of Ricard Solé.

My current research line focuses on understanding how nonequilibrium thermodynamics constrains biomolecular functionality, such as information transmission, biochemical oscillations and fast sensing. I am also interested in how these constraints operate in minimal systems that may have been present at the origin of life, including simple molecular replicators and phase-separated protocells. A complementary direction concerns thermodynamic inference: how to use observed time-series data to infer underlying thermodynamic properties such as affinities and dissipation. Finally, I continue to develop my information-theoretic methods for coarse-graining and decomposing complex systems.

The Ramón y Cajal position would allow me to consolidate my research program in Spain, while strengthening my national and international network of collaborators. I propose three research lines for development:

1. Nonequilibrium thermodynamics in biomolecular and protobiological systems: I will scale up fundamental bounds from nonequilibrium thermodynamics to cellular-scale metabolic networks, signaling systems and phase-separated protocell models, to understand how energy and information constrain the organization and function of simple self-sustaining nonequilibrium systems.
2. Thermodynamic inference: I will extend and test my work on inferring affinities, forces and entropy production in new types of nonequilibrium systems (long-time observations, many-body systems, active matter), including in collaboration with experimentalists. I am also interested in studying fundamental information-theoretic limits on the performance of thermodynamic inference.
3. Information-theoretic principles for understanding learning models: in this forward-looking research line, I will use semantic information, goal-directedness, information bottleneck and partial information decomposition to identify functionally relevant internal variables, infer effective $\mathbb{E}[\text{goals}]$, and construct coarse-grained, interpretable descriptions of high-dimensional machine-learning models.

Resumen del Currículum Vitae:

I have an international research trajectory, with training and professional appointments in the USA, Japan and Spain. After completing an interdisciplinary undergraduate degree at New York University (B.A., Magna Cum Laude) in New York City, I pursued a PhD in complex systems at Indiana University (Bloomington, USA) with Luis M. Rocha. I then spent several years as a postdoctoral researcher at the Santa Fe Institute (Santa Fe, NM, USA), a research institute devoted to the science of complex systems. During 2022-2023, I spent a year as a visiting researcher at the University of Tokyo in the group of Sosuke Ito, a leading expert on stochastic thermodynamics. Currently, I am a Marie Curie fellow at Universitat Pompeu Fabra in Barcelona, working in the group of Ricard Solé.

My scientific output consists of 48 peer-reviewed publications, including papers in top journals such as Physical Review Letters, Physical Review X, Nature Communications and PNAS, as well as in leading machine-learning conferences such as ICLR. These publications have received over 2,800 citations (Google Scholar) from researchers in statistical physics, biology, machine learning and other fields.

I have obtained competitive funding both as an independent fellow and within collaborative projects. In addition to being PI of a Marie Curie fellowship, I have been co-PI on two grants from the John Templeton Foundation on goal-directed behavior and semantic information in minimal physical and chemical systems. With support from these and other grants, I have co-organized several international conferences, including events at the University of Rochester (USA), the Basque Center for Applied Mathematics (Bilbao, Spain) and Kyoto University (Japan). I am also a referee for several top journals and conferences (including PRL, PRX, ICLR and others) and for international (ERC) and national (Spanish Research Agency, Swiss National Science Foundation) funding agencies.

Finally, I have mentoring experience that spans undergraduate, doctoral and postdoctoral levels. I have hired and supervised a postdoctoral researcher, served on a PhD committee and supervised undergraduate projects in the Santa Fe Institute REU program.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: IVANOV, SERGEI
Referencia: RYC2025-056036-I
Correo Electrónico: ivanoff.iks@gmail.com
Título: Nonlinear Optical Phenomena in Topological Systems Based on Advanced Materials

Resumen de la Memoria:

Topological insulators are a rapidly advancing area of research with significant potential for practical applications. These materials exhibit a band gap while possessing non-trivial topological properties in their band structures, influenced by either the material's intrinsic structure or external physical factors. Such factors include the breaking of inversion symmetry or symmetry reversal concerning an evolutionary variable, such as time or the direction of light propagation. At the interfaces between topological insulators and materials with differing topologies, edge states emerge that are topologically protected. These states, safeguarded by the system's topology, exhibit immunity to defects and are remarkably resistant to backscattering during propagation. Optical topological insulators, in particular, display a unique ability to generate strong nonlinear responses. This property, combined with their topological characteristics, enables the exploration of innovative phenomena such as topological solitons, topological lasers, advanced optical routers, switches, and frequency generators.

Recent studies have revealed that metal halide perovskite materials possess significantly larger nonlinear coefficients compared to other semiconductors, making them highly promising for topological optics. This research focuses on exploring a broad spectrum of nonlinear optical phenomena within perovskite semiconductors integrated into planar waveguides and fibers. These new materials, with their exceptionally strong nonlinear responses, also have the potential to revolutionize the field of topological optics. The project aims to leverage these groundbreaking materials in topological systems while advancing the development of next-generation topological insulators based on aperiodic structures. These advancements provide opportunities to utilize alternative symmetries and expand the range of practical applications. The successful execution of this research is anticipated to uncover novel methods for controlling high-intensity light propagation in topological media. Ultimately, these advancements could lead to transformative applications in secure data transmission, the design of topological lasers, and the optimization of nonlinear optical interactions across diverse technological domains.

Resumen del Currículum Vitae:

Sergei (Sergey) Ivanov has dedicated his career to advancing fundamental theoretical research in nonlinear physics and topological insulators, working closely with experimentalists. He has developed innovative methods to describe the dynamics of complex nonlinear structures such as dispersive shock waves and solitons, and his research has unveiled the impact of waveguide arrays on light propagation in nonlinear media, including solitons, vortices, and light bullets. His notable contributions include pioneering nonlinearity-induced topological insulators, identifying Floquet edge topological solitons, and advancing nonlinear second-order photonic topological insulators. Ivanov's work is characterized by advanced analytical and numerical methods, often conducted in collaboration with large teams he coordinated. With over 40 publications in leading scientific journals, Ivanov has served as the first author in 30 and the corresponding author in 25. His research, published in prestigious journals like Science, Nature Phys., and Phys. Rev. Lett., has received significant recognition, with over 1,000 citations and an h-index of 18 (Google Scholar, EON8EAUAAAJ). Over 50% of his papers appear in top-tier (Q1) journals. Ivanov has actively shared his findings at over 20 conferences, including CLEO, and has delivered five invited talks at international events, highlighting the global recognition of his work.

He has extensive international experience, beginning with his education and early research at the Moscow Institute of Physics and Technology (MIPT) and the Institute of Spectroscopy of the Russian Academy of Sciences (ISAN). He continued with postdoctoral roles at the Institute of Photonic Sciences (ICFO) in Spain and the University of Valencia (UV). Collaborating with leading scientists worldwide he has co-authored over 20 articles with these researchers. His collaboration with Xi'an Jiaotong University in China resulted in an Editor's Pick article, where he served as the first author.

Ivanov has demonstrated leadership as the Principal Investigator of two grants funded by the European Social Fund Plus and the Russian Foundation for Basic Research. He independently managed budgets, research directions, and reporting, and contributed as a Key Researcher to six additional grants. His mentorship includes supervising a graduate student at ISAN, providing training in analytical and numerical methods, and delivering lectures in physics and mathematics. His leadership extends to supervising experimental teams for papers where he is the first author, bridging theoretical and experimental approaches. As a referee, Ivanov has reviewed over 40 papers for prestigious journals, including Nat. Photon., Phys. Rev. Lett., and Nano Lett., further underscoring his expertise and recognition in the field of physics.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: FERNÁNDEZ MANTECA, PEDRO JOSÉ
Referencia: RYC2025-054618-I
Correo Electrónico: pedro.fernandez.manteca@gmail.com
Título: From Precision Measurements to Real-Time AI for Discovery at the LHC
Resumen de la Memoria:

I have developed my entire scientific career in experimental high-energy physics at the Large Hadron Collider as a long-standing member of the CMS Collaboration. After completing my PhD at the University of Cantabria on precision diboson measurements and the first CMS search for a dark Higgs boson, I broadened my expertise with a Master's in Data Science, integrating advanced machine-learning methods into collider analyses. I subsequently held postdoctoral positions at Rice University and Fermilab, and I now serve as a Research Fellow at CERN. My work spans precision Higgs physics, BSM searches, and the design and commissioning of trigger and reconstruction algorithms, particularly for muon systems. I have led numerous CMS publications, coordinated major physics subgroups, and received two CMS Awards and two Fermilab LPC Distinguished Researcher Awards.

Building on this trajectory, I propose a research line centred on real-time artificial intelligence for the CMS Phase-2 Level-1 Trigger. The goal is to develop ultra-low-latency, model-agnostic anomaly-detection algorithms operating directly in FPGA firmware. These methods will exploit Phase-2 upgrades' extended latency budget, the two-layer Correlator, and Particle-Flow information at trigger level to learn high-dimensional representations of Standard Model event structure and identify out-of-distribution topologies associated with unconventional new-physics signatures. The methodology includes producing curated training datasets with full Phase-2 emulation; designing contrastive, full-event self-supervised models robust to pileup and detector effects; and translating them into resource-efficient HLS firmware validated through bit-accurate and hardware-in-the-loop tests.

This line represents a qualitative shift from my previous work: from analysing trigger outputs to co-designing the trigger intelligence itself, moving from software-level supervised models to embedded self-supervised architectures. Its expected impact includes enabling new discovery channels at the HL-LHC, establishing reusable embedded-AI frameworks for CMS, and creating a national hub of expertise in real-time AI for scientific instrumentation. The outcomes will be fully aligned with FAIR and open-science principles, including the release of data schemas, emulators, and synthesis flows. By developing embedded AI for next-generation FPGAs, this research will strengthen Spain's contribution to CMS Phase-2 and support cross-disciplinary applications in sectors such as aerospace, autonomous systems, and medical imaging.

Resumen del Currículum Vitae:

I am an experimental particle physicist with more than ten years of experience in the CMS experiment at CERN. I obtained my PhD at the University of Cantabria, where I produced high-impact measurements of $W\gamma$ production and conducted CMS's first search for a dark Higgs boson. In parallel, I completed a Master's in Data Science, consolidating expertise in AI-based modelling and large-scale scientific computing. Since 2022 I have held international research positions at Rice University, Fermilab, and CERN, where I am currently a Research Fellow.

My scientific record encompasses precision Higgs measurements, BSM searches, and detector-level developments. I have led analyses resulting in key CMS publications, including the first Higgs-width determination in the WW channel and multiple searches for dark-sector signatures. My work on muon reconstruction, calibration, and trigger algorithms has been integrated into CMS operations during Run-2 and Run-3 and is used by numerous physics analyses. I have contributed to more than 1100 CMS papers, presented results at major international conferences, and coordinated physics groups involving more than 100 researchers worldwide. My leadership has been recognised with two CMS Awards and two Fermilab LPC Distinguished Researcher Awards, making me the first Spanish researcher to receive the LPC award twice.

I have substantial experience in mentorship and training: I have supervised PhD students, six MSc/BSc theses, and a CERN Summer Student, and I regularly teach graduate-level courses on trigger systems, reconstruction, and machine learning. I also contribute to large-scale training initiatives, such as the CMS Data Analysis School, and have served on international scientific committees, including the ECFA Early-Career Researchers Panel.

My work consistently incorporates open-science practices. I deposit analysis-level results in HEPData, release simplified likelihoods, maintain FAIR documentation, and contribute to CMS Physics Briefings for broad dissemination. I have also played an active role in instrumentation outreach and science communication.

Internationally, I have spent more than five years at CERN and Fermilab, fostering collaborations across European and US institutions. I have co-organized international workshops, contributed to trigger-system R&D for the HL-LHC, and attracted competitive funding that supported institutional research activities.

Overall, my curriculum demonstrates a solid combination of scientific leadership, technical innovation, and community service across analysis, software, trigger systems, and international coordination within CMS. This background positions me to lead an independent research program at the interface of machine learning, real-time instrumentation, and high-energy physics, with strong potential for impact both within CMS and beyond.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: ROULET, JAVIER
Referencia: RYC2025-055857-I
Correo Electrónico: javierroulet@gmail.com
Título: Unveiling the origin of black-hole binaries with gravitational waves

Resumen de la Memoria:

I am an expert in gravitational waves, black-hole astrophysics, and signal processing. I have developed advanced algorithms for detecting gravitational waves from compact binary mergers, measuring their source parameters, characterizing their population, and comparing it to theoretical predictions from leading formation channels. My work has strengthened the observational foundations of gravitational wave astronomy, provided one of the leading independent validations of LIGO-Virgo-KAGRA results, and established pioneering constraints on the formation mechanisms of binary black holes.

I obtained my PhD from Princeton University in 2021 (advisor: Matías Zaldarriaga), where I began a productive collaboration with postdocs at the Institute for Advanced Study. I constructed a waveform-template bank for searches in gravitational-wave data (Roulet+2019b, 49 cit.) and used it to help conduct searches that confirmed previous detections and identified 37 new binary black-hole events (Venumadhav+2019,2020; Zackay+2019,2021; Olsen+2021). I developed a framework to combine individual measurements into a likelihood for their collective distribution, accounting for measurement uncertainties, selection effects, and, for the first time, event significance (Roulet & Zaldarriaga 2019a; Roulet+2020). Using this, I constrained models of the population's masses, spins, merger rates, and redshift evolution, showing that the spin-orientation distribution is likely anisotropic and disfavoring purely dynamical formation channels (Roulet+2021).

As a postdoc at the Kavli Institute for Theoretical Physics (2021-2022), I developed methods for efficient, robust parameter estimation, including a coordinate system that removes correlations and multimodality (Roulet+2021), released the open-source inference software cogwheel, and mentored undergraduate and graduate students.

As a Burke Fellow at Caltech (2022-2025), I introduced a likelihood-marginalization algorithm (Roulet+2024a) that launched a new research line in our group. We performed a pioneering search including higher-order gravitational-wave modes (Wadekar+2024a,b), improving sensitivity to high-mass-ratio binaries (Mehta+2025) and identifying new events (Wadekar,Roulet+2025). I co-authored a review (Roulet & Venumadhav 2024), co-developed the first phenomenological waveform model including transitional precession (Yu,Roulet+2023), and helped lead the first search for high-tidal-deformability compact objects (Chia+2023). I contributed to the theoretical groundwork for constructing a global-fit catalog for LISA (Johnson,Roulet+2025), helped design infrastructure for community catalogs in the Gravitational Wave Open Science Center, mentored a summer undergraduate student, organized an international cosmology school, and taught at the Prospects in Theoretical Physics program at IAS.

In 2025 I became a joint fellow at the Kavli Institute for Cosmological Physics and the Institute for Advanced Study, joining the Simons Collaboration on Black Holes and Strong Gravity. I am developing efficient, interpretable machine-learning inference methods and supervising work on detecting gravitational-wave lensing.

Resumen del Currículum Vitae:

CURRENT POSITIONS (2025-):

- ☐ KICP Postdoctoral Fellow at the University of Chicago
- ☐ Member at the Institute for Advanced Study.

RESEARCH

- ☐ Expert in gravitational-wave physics, black-hole astrophysics, and statistical/algorithmic methods for data analysis.
- ☐ Developed powerful techniques for gravitational-wave searches, parameter estimation, and population inference; contributions include template-bank construction, likelihood marginalization, and Bayesian inference tools.
- ☐ Significantly involved on multiple searches identifying 37 previously unknown binary black hole mergers in LIGO-Virgo-KAGRA data.
- ☐ Developer of cogwheel, an open-source parameter-estimation code implementing several original algorithms.
- ☐ Established constraints on black-hole formation channels, mass and spin distributions, merger-rate evolution.
- ☐ Developed theoretical foundations for LISA's global-fit postprocessing.

FELLOWSHIPS

- ☐ KICP Postdoctoral Fellowship (UChicago), 2025-
- ☐ Membership (Institute for Advanced Study), 2025-
- ☐ Burke Fellowship (Caltech), 2022-2025
- ☐ President's Fellowship (Princeton), 2016-2017
- ☐ CONICET Doctoral Fellowship (Argentina), 2016

EDUCATION

- ☐ PhD in Physics, Princeton University, USA
- ☐ Licenciatura in Physics, Universidad de Buenos Aires, Argentina



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

PUBLICATIONS

Author of 23 refereed publications (short-author-list), >2000 citations (>88/paper), h-index 20; lead author of an invited Annual Review article. (stats: inspire-hep 7/12/2025)

SERVICE

- ☑ Experience designing and mentoring research projects; mentored undergraduate and graduate students (all have successfully continued in academia).
- ☑ Regular reviewer for major journals (PRX, PRD, ApJ, ApJL, MNRAS, A&A).
- ☑ Delivered 9 invited seminars and numerous conference presentations
- ☑ Active in outreach through public talks, telescope observation events, and educational programs.
- ☑ Taught 10 graduate- and undergraduate-level Physics courses at Princeton University and Universidad de Buenos Aires.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: SORIANO PAÑOS, DAVID
Referencia: RYC2025-055159-I
Correo Electrónico: sorianopanos@gmail.com
Título: Multiscale characterization of infectious diseases through the lens of complex systems science
Resumen de la Memoria:

My research has been focused on understanding the emergence of collective behaviors across different social and biological systems through the lens of complex systems science. Within the broad scope of my research, my most productive research line has been the multiscale characterization of infectious diseases.

This research line started with a theoretical exploration of how recurrent mobility shapes epidemic dynamics. By introducing the Movement-Interaction-Return (MIR) framework, we demonstrated that reducing commuter flows can worsen outbreaks. Extensions of this model uncovered how socioeconomic differences in mobility alter the spatial distribution of disease and how daily travel patterns influence vector-borne epidemics such as Dengue. These early works established a long-term research program linking human mobility to disease propagation. During the COVID-19 pandemic, I was part of an international modelling team to adapt the MIR model into a theoretical framework for real-time epidemic modelling. The resulting model was widely cited and used by governmental bodies in Spain and Colombia to guide lockdown design and short-term epidemic forecasting.

I have been also interested in modelling within-host dynamics to understand the course of different diseases such as bacterial infections in fruit flies or Malaria inside mice. Coupling both scales, I have explored how the cooperation of competition between simultaneous diseases, due to within-host dynamics, crucially change their epidemic trajectories at the population level.

More recently, my research has shifted toward eco-evolutionary dynamics. I developed new theoretical frameworks to overcome limitations in classical antigenic-evolution models, incorporating realistic mutation spaces and joint evolution of transmissibility and antigenicity. These efforts produced analytical and computational results explaining why mildly infectious viruses may be more likely to reach endemicity and how complex antigenic networks can reproduce observed evolutionary and epidemiological patterns of viruses such as H3N2. In parallel, I contributed to studies in population genetics, showing how species' biological traits shape the impact of habitat changes on genetic diversity.

Building on these foundations, my future research as a Ramón y Cajal fellow will focus on the intertwined evolution and epidemiology of rapidly evolving viruses. This agenda involves four objectives: (1) generating antigenic networks endogenously from coupled genotype-phenotype maps and transmission dynamics; (2) formulating multiscale models that treat populations as interconnected within-host ecosystems; (3) explaining anomalous diffusion in genomic spaces through multiscale eco-evolutionary processes; and (4) assessing how behavioural and policy interventions influence long-term viral evolution and epidemic trajectories. Altogether, this research line aims at using a multiscale approach to understand how viral evolution, human behavior and control policies determine the impact of epidemic outbreaks.

Resumen del Currículum Vitae:

David Soriano Paños received a degree in Physics in 2016, a master's in Physics and Physical Technologies in 2017 and a PhD in Physics in 2021, all from University of Zaragoza in Spain.

In 2019, during the PhD, David did a research stay at University of Rochester in United States.

In January 2022, he joined Instituto Gulbenkian de Ciência as a PONTE fellow, an independent postdoctoral position held until December 2023. Since 2024, he is a Juan de la Cierva postdoctoral researcher at Universitat Rovira i Virgili.

He has co-authored 39 scientific articles in peer-reviewed journals. Overall, these publications have gathered 726 (1378) citations with a h-index 12 (14) according to Web of Science (Google Scholar) as of November 24, 2025.

He has participated in 23 conferences, divided into 8 national conferences and 15 international ones. Among the contributions presented in the conferences, 5 were posters, 14 were oral contributions and 5 were invited oral talks. He has been an invited lecturer in 2 international schools and courses. Moreover, he has organized 2 national conferences and 1 international one. He is currently organizing one national conference and another international one. He has participated as member of the scientific committee in 10 international conferences and 1 national one.

He accumulates 233 teaching hours lecturing five different courses for graduate and undergraduate students at four different universities. He has co-supervised 1 PhD thesis, 1 Masters' thesis and 6 Bachelors' theses and supervised 2 Masters' theses. Currently, he is co-supervising 1 PhD student and 1 Masters' thesis.

David's PhD thesis was awarded with "Premio Extraordinario" by the Doctorate school of University of Zaragoza in 2021. In 2023, David received the Emerging Scientist Award from the Complex Systems Society, recognizing the importance of his innovative reaction-diffusion frameworks and their profound implications for epidemic control strategies. In 2025, he was elected as a board member of the Spanish Chapter of the Complex Systems Society.

He has acted as a referee for 23 international journals including Nature Physics, Physical Review Letters, Communications Physics or Nature Computational Science among others, reviewing a total number of 57 articles.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Regarding outreach activities, he participated in the European night of researchers in 2020 to disseminate the results of his research and participate in two editions of Campus EstiURV and Campus fisicomatemàtic d'estiu, giving 12 hours of introductory courses to engage high school students into network science.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: CAYAO DÍAZ, JORGE LUIS
Referencia: RYC2025-054454-I
Correo Electrónico: jolcad17@gmail.com
Título: Exploration and understanding of emerging superconducting phenomena

Resumen de la Memoria:

My scientific career is grounded in the field of Condensed Matter Theory, and can be roughly divided into three periods. The first period involved my PhD dissertation work at the Materials Science Institute of Madrid, at the Spanish Research Council (CSIC), during 2012-2016. Then, a second and third periods at the Department of Physics and Astronomy at Uppsala University, first as a postdoctoral researcher (2016-2021) and since 2022 as independent researcher leading an independent research group. The research in my group is fully funded by external grants, of which I am the main applicant and principal investigator.

During my scientific career, I have developed and extensively used effective low-energy models to provide conceptual understanding and predict emergent superconducting phases. In particular, my scientific contributions represent key developments in topological matter, odd-frequency superconductivity, non-Hermitian phases, Floquet engineering, and unconventional magnetism. My research has produced a strong publication record, which consists of 61 research articles (52 peer-reviewed and 9 submitted for publication) with 2217 citations and h-index of 24 (Google scholar). Furthermore, my scientific career has benefited from my well-established network of world-known collaborators as well as from the supervision of students at distinct levels and in different countries. I am therefore at an exceptional leading position to pursue frontier theoretical research in condensed matter physics.

My research proposal aims at exploring the realistic conditions and properties of minimal Kitaev chains and unconventional magnets for the realization of topological superconducting states and the engineering of useful quantum applications. The main objectives of this research proposal are: A) Realize topological superconductivity in dissipative and time-dependent minimal Kitaev chains, B) Identify the conditions for topological superconductivity in unconventional magnets, C) Exploit topological matter for robust superconducting spintronics and quantum information. Reaching the goals of this proposal will mean big advance in the field of superconductivity, uncovering novel ways for realizing topological superconductivity, which will establish a leading research program.

Resumen del Currículum Vitae:

I performed my PhD in Condensed Matter Physics at the Materials Science Institute of Madrid, CSIC, during 2012-2016, and then moved to Uppsala University as a postdoc. Since 2022 I have led an independent research group at Uppsala University formed by myself, one postdoc, and one jointly supervised PhD student, all fully funded by my external grants. The research activities of my group involve four research directions addressing theoretical aspects of emerging superconductivity in topological matter, odd-frequency superconductivity, non-Hermitian phases, and Floquet engineering.

The excellence of my research is reflected in both my scientific activity and my high-quality publication record, which include 61 research articles (52 peer-reviewed and 9 submitted for publication) with 2217 citations and h-index of 24 (Google scholar). Moreover, I have given 40 invited talks at international events, and have a well-established network of collaborators worldwide. Furthermore, I obtained several prestigious research grants, such as the VR starting grant (2022), the small Göran Gustafsson prize for young researchers (2022), the Carl Trygger's postdoc grant (2022), all as PI, while a WISE PhD student grant (2023) and the JSPS visiting fellow grant (2023) as co-PI.

During my career, I have supervised students at distinct levels, including 3 postdocs, 2 PhD students, 6 master students, and two bachelor students. Moreover, I have been external examiner of a Licentiate defense as well as evaluator of grant proposals, and served as a reviewer for several journals. I also have experience teaching courses such as General Physics labs, Quantum Physics, Quantum Materials, and Superconductivity.

I have also been actively engaged in public outreach, where I have designed and delivered lectures about education and different topics of physics to the general public, including high schools' students, teachers, and people without academic background.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: DE MIGUEL HERNÁNDEZ, JAVIER
Referencia: RYC2025-055561-I
Correo Electrónico: demiguel.javier@gmail.com
Título: Opening new high-frequency windows for axion and dark-sector searches

Resumen de la Memoria:

I am an experimental physicist working at the interface between particle and astroparticle physics, specialising in direct searches for axion dark matter. Over the past five years I have developed a coherent research programme that opens a new high-frequency frontier for axion detection in a theoretically well-motivated yet largely unexplored region of the QCD parameter space. My work integrates two complementary directions: innovative laboratory instrumentation and astrophysical searches using highly magnetised neutron stars (NSs).

In the laboratory domain, I conceived and developed DALI, a next-generation axion detector based on a magnetised phased-array architecture coupled to an open Fabry-Pérot resonator. This concept enables broadband, directional sensitivity in the 6–60 GHz range (25–250 micro-eV), beyond the reach of conventional cavity haloscopes. As Principal Investigator, I led the design and construction of the first DALI Proof-of-Principle prototype, demonstrating all key subsystems—tunable resonator, cryogenic operation, electromagnetic insulation and broadband receiver chain—and validating the feasibility of the full-scale experiment. The prototype is now entering its scientific commissioning phase, while the full-scale DALI instrument is being prepared for an international Preliminary Design Review scheduled for 2026.

In parallel, I developed a new axion-photon conversion framework in NS magnetospheres that incorporates pair multiplicity, relativistic corrections and realistic magnetic-field geometries. This model predicts efficient conversion at frequencies up to ~200 GHz (~1 meV), a regime inaccessible to current laboratory searches. I have led the first observational campaign targeting this mass range through high-resolution sub-mm spectroscopy of the Galactic-Centre magnetar SGR 1745–2900, obtaining the first constraints on axion dark matter in the 0.5–0.6 meV window at QCD-motivated sensitivity. This establishes NS spectroscopy as a complementary high-mass axion search channel.

Together, these two lines define a broadband, experimentally grounded route to explore axion dark matter across frequency ranges previously inaccessible, unifying laboratory and astrophysical strategies under a common photon-conversion framework. In parallel, I also lead dedicated searches for dark-photon dark matter and high-frequency gravitational waves using DALI-class instrumentation.

My trajectory is characterised by early scientific independence, sustained leadership and the ability to attract competitive funding. I serve as Principal Investigator and Spokesperson of the DALI Collaboration, have secured >800 k€ in competitive programmes, and have been awarded fellowships such as the FPI (2017–2020), the RIKEN SPDR (<10%; 2021–2024) and the La Caixa Junior Leader Incoming (<10%; 2024). I have authored 20 publications—15 as first or corresponding author—supervised postdoctoral and graduate researchers, and contributed to international networks including COSMIC WISPer, GravNet and the Patras Workshop series.

Resumen del Currículum Vitae:

I am an experimentalist specialising in direct detection of dark matter and weakly interacting particles. After contributing to CMB-instrumentation during my PhD (QUIJOTE, TMS, GroundBIRD), I steered my expertise in RF/microwave systems toward particle-physics experimentation, focusing on axions and high-frequency gravitational waves.

A central contribution of my career has been to open two previously inaccessible frequency ranges for axion dark-matter searches through complementary experimental and astroparticle strategies:

(i) Laboratory line. I lead the DALI programme as Principal Investigator and Spokesperson of the DALI Collaboration (RIKEN, IAC, Hamburg, Patras, Messiah University). I conceived the DALI concept and directed the design, fabrication and commissioning of its demonstrator, DALI(PoP), securing >800 k€ through highly competitive programmes. DALI introduces a new open-resonator haloscope architecture enabling axion searches in the 6–60 GHz band (~25–250 micro-eV), a region poorly explored by existing experiments. The demonstrator has been successfully built, operated under cryogenic and high-vacuum conditions, and is being prepared for a first data campaign. The DALI experiment has been recognised by the EU COST Action COSMIC WISPer as an outstanding initiative in the high-frequency axion domain and selected by the Spanish Ministry as a Singular Scientific and Technical Infrastructure.

(ii) Astroparticle line. As a complementary strategy extending into the sub-meV regime, I developed the first axion-photon conversion framework that incorporates pair multiplicity and relativistic plasma effects in strongly magnetised neutron star environments. This model predicts axion signals in the 0.1–1 meV range, where laboratory techniques rapidly lose sensitivity. I lead the first observational test of this framework through a targeted ALMA programme (oversubscription >8:1), which has produced the first exclusion limits on pure axion dark matter in the ~0.5–0.6 meV band.

To date I have authored 20 publications, including 15 peer-reviewed papers as first or corresponding author (10 in Q1 journals). My work has been supported by competitive fellowships such as the FPI grant (2017–2020), the RIKEN SPDR programme (2021–2024, success rate <10 %), and the La Caixa Junior Leader fellowship (2024, success rate <10 %). My project proposals have received top-level evaluations, including an A rating in the ERC Starting Grant 2023 and advancement to Step 2 of the KAKENHI Kiban S programme in Japan.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Beyond my 3.5-year research period at RIKEN (Japan), I have undertaken research stays in Manchester and Milan. I have supervised one postdoctoral researcher, two MSc theses, a junior engineer, a summer fellow, and two undergraduate trainees, contributing to specialised training in microwave instrumentation and axion detection.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: CHAVES MONTERO, JULIO JONÁS
Referencia: RYC2025-055097-I
Correo Electrónico: jonaschavesmontero22@gmail.com
Título: Cosmology meets Astrophysics (COAST)

Resumen de la Memoria:

I am a theoretical astrophysicist specializing in cosmological analyses of the large-scale structure of the Universe. I completed my PhD at CECA (2013-2017) and subsequently held postdoc positions at Argonne National Laboratory (2017-2020), DIPIC (2020-2022), and IFAE (2022-2025). During this time, I authored 85 publications with 5800+ citations (h-index 28). I coordinated 17 of these projects, which resulted in 10 of which I am the first author and 4 led by ECS under my supervision. My work has been recognized through several leadership appointments. I served as coordinator of the J-PAS's Photometric Redshift Working Group from 2020 to 2022, coordinator of the Euclid's Mock Data Challenges Work Package since 2024, and coordinator of the DESI's Lyman-alpha Small Scales Topical Group since 2025.

My research has significantly advanced large-scale structure cosmology, contributing to extending cosmological analyses into the nonlinear regime. I showed that, at the time, not even the most advanced empirical models could describe galaxy clustering in the nonlinear regime accurately (CM et al. 2016, 159 citations), found that the lensing-is-low problem – the discrepancy between weak lensing measurements around massive galaxies and theoretical expectations on small scales – originated by the incorrect modeling of baryonic effects rather than a tension in cosmology (CM et al. 2023), and led the cosmological analysis of small-scale Lyman-alpha measurements from DESI DR1 (CM et al. 2026), which yielded the tightest constraints on the running of the spectral index and the effective number of relativistic species to date. Furthermore, I co-designed a model aiming to extend galaxy clustering analyses towards nonlinear regime (CM and Hearin 2020; CM and Hearin 2021; Hearin, CM et al. 2021; 2023), which remains under active development, and studied in detail some of the astrophysical effects causing the lensing-is-low problem (Montero-Dorta, CM et al. 2021; Contreras, CM et al. 2021; Garcia-Moreno & CM 2025).

I propose developing COAST (COsmology meets ASTrophysics), a theoretical model designed to extend galaxy clustering analyses into the highly nonlinear regime. COAST will address the limitations of current models by a) extending galaxy clustering analyses to 0.1 Mpc/h, increasing the scale range of current analyses by two orders of magnitude; b) assigning multiple astrophysical properties to simulated galaxies, enabling it to incorporate astrophysical probes such as the stellar mass function as constraining data during cosmological inference; c) generating simulated universes mirroring survey observations, enabling marginalization over more systematic effects during inference. COAST is poised to set sub percent constraints on the equation of state of dark energy by analyzing the DESI DR4 observations. Developing COAST requires expertise across multiple areas of cosmology and astrophysics, knowledge I have built throughout my scientific career. Furthermore, my leadership roles in DESI and Euclid uniquely position me to lead this effort.

Resumen del Currículum Vitae:

I am a theoretical astrophysicist specializing in cosmological analyses of the large-scale structure of the Universe. I completed my PhD at CECA (2013-2017) and subsequently held postdoc positions at Argonne National Laboratory (2017-2020), DIPIC (2020-2022), and IFAE (2022-2025). During this time, I authored 85 publications with 5800+ citations (h-index 28). I coordinated 17 of these, which resulted in 10 articles of which I am the first author and 4 led by ECS under my supervision. My work has been recognized through several leadership appointments. From 2020 to 2022, I served as coordinator of the J-PAS's Photometric Redshift Working Group, tasked with achieving sub-percent redshift accuracy from multi-band data; since 2024, I have coordinated Euclid's Mock Data Challenges Work Package, which assesses the robustness of cosmological analyses using simulated catalogs; and I have recently started to coordinate the DESI's Lyman-alpha Small Scales Topical Group, focused on extracting cosmological information from the Lyman-alpha forest on small to intermediate scales.

My most significant findings are showing that, at the time, not even the most advanced empirical models could describe galaxy clustering in the nonlinear regime accurately (CM et al. 2016, 159 citations); resolving the missing baryon problem – the discrepancy between the amount of baryons detected in the early and late Universe – by carrying out the most complete baryon census to date (CM et al. 2021); figuring out that the lensing-is-low problem – the discrepancy between weak lensing measurements around massive galaxies and theoretical expectations on small scales – originated by the incorrect modeling of baryonic effects rather than a tension in cosmology (CM et al. 2023); and leading the cosmological analysis of DESI DR1 Lyman-alpha measurements from small scales (CM et al. 2026), which yielded the tightest constraints on the running of the spectral index and the effective number of relativistic species. Furthermore, PhD students under my supervision led supporting publications for the DR1 and DR2 DESI BAO analyses (Gordon, Cuceu, CM et al. 2023; Casas, Herrera-Alcantar, CM et al. 2025), whose cosmological interpretation provided the first evidence for evolving dark energy.

I have delivered 50 talks and seminars, including 10 as a plenary/invited/keynote speaker; engaged in many outreach and dissemination activities, giving 8 talks at schools and science festivals, contributing to 5 press releases, participating in 9 media interviews, and serving as a scientific advisor on 8 occasions, including for EL PAÍS (2023). I organized 11 international meetings, including Mock Barcelona as chair of the SOC and LOC and competitive symposia at two EAS and one SEA annual meetings as chair. I formally supervised 1 PhD student, 5 MSc students, and 1 BSc student; served on 1 PhD and 2 MSc defense panels; and acted as an external PhD reviewer, invited reviewer for Spanish funding calls, and referee for multiple journals. I have also served for two years on the DESI ECS and DEI Committees, participated for several years in the DESI and IFAE mentoring programs, and organized the monthly seminars of the IFAE Cosmology Group since 2023.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: HERNANDEZ MEJIAS, SARA
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Título: From Molecular Design to Photonic Function: An Interdisciplinary and International Pathway in Biohybrid Science

Resumen de la Memoria:

My scientific career stands out for having successfully merged protein engineering, orthogonal chemistry, and spectroscopy to develop photoactive biohybrids optimized for applications in photonics and photochemistry. After completing my Bachelor's Degree in Physics in 2011, I enrolled in a Master's Degree in Biophysics. In 2013, I was awarded the PhD grant from the Basque Country and joined Prof. Cortajarena's group at IMDEA Nanoscience, where I focused on protein engineering to create functional nanostructures and nanomaterials. In 2016, I earned my PhD degree in Biophysics summa cum laude. Since then, I have worked in laboratories in the Netherlands, Sweden, Spain, and the US, gaining interdisciplinary research experience and expanding my international network. In 2022, I founded the Bioengineered Nanophotonics Research Group (www.sarahmejias.com) to investigate how amino acids affect the photoresponse of engineered biohybrids. By leveraging my interdisciplinary expertise, I developed a new framework for designing model biohybrids in which engineered interactions between recombinant proteins and synthetic chromophores enable precise control over chromophore excited-state relaxation dynamics. This creative thinking proves my ability to develop independent research lines distinct from the work of my former PhD and postdoctoral mentors.

The main goal of my research is to transform biohybrids from basic constructs into advanced tools capable of generating novel photonic responses with the potential to drive technological innovation. My contributions to biohybrid engineering include biophysical models to probe protein-environment interactions and novel approaches for protein assembly. With these contributions, I have published 21 peer-reviewed articles (11 as first author, 3 as corresponding author, and 2 as invited book chapters). Recognitions include the 2023 AntalGenics Prize from the Spanish Society of Biophysics (SBE) and listing in the 2024 FECYT database as a leading scientist in biohybrids. These recognitions highlight the relevance of my research lines and position me as a reference scientist in the field of biohybrids.

Building on my previous research, I propose a new research direction that integrates biohybrid engineering and protein assembly to move beyond individual biohybrids toward collective photoresponses encoded by organized assemblies. The objective is to create nanostructured biohybrid arrays in which controlled interprotein interactions generate optomechanical coupling. To achieve this, I will establish a dedicated research framework to generate hierarchical biohybrid assemblies with precise control over orientation, spacing, and coupling through bottom-up self-assembly principles. This research represents a clear conceptual and methodological shift from protein-level photoresponse toward architectural control across length scales, enabling emergent system-level photonic functionality. By bridging fundamental science and application, the proposed research line has the potential to transform quantum biohybrid research into a design-driven discipline. The Ramón y Cajal program will provide the visibility, stability, and resources required to establish and lead an internationally competitive research line at the interface of biohybrid photonics and quantum nanoscience.

Resumen del Currículum Vitae:

I am the group leader of the Bio-Engineered Nanophotonics group at IMDEA Nanoscience in a tenure-track position. My research focuses on controlling biohybrid photoresponse by combining proteins and chromophores in synergy. In under two years, I have grown my team from one PhD student to five PhD candidates and two postdocs. This growth is supported by nearly 1 M€ in funds I secured as principal investigator (PI), including grants from the Comunidad de Madrid, the Spanish Ministry of Science, and private foundations like La Caixa and BBVA. Over the past two years, I have also participated in international research consortia, including MATRIX_CM, funded by the Comunidad de Madrid under the TECNOLOGÍAS program (1.2 M€), where I serve as principal investigator, and ACXIOM-CM, funded under the PROYECTOS SINÉRGICOS program (700 k€).

My leadership is evident in the international collaborations I coordinate with worldwide researchers across disciplines. Key collaborations include working with Prof. Beat Vögeli (University of Colorado, US) to perform structure studies in biohybrids using NMR spectroscopy, with Dr. Claudio Masciovecchio (scientific director at FERMI Free Electron Laser, Italy) to investigate protein quasicrystals for dynamic studies in XFEL and with Prof. Lorenzo Cupellini (University of Pisa, Italy) where we use molecular dynamics and DFT simulations to explore biohybrid relaxation mechanisms.

I have experience in supervising PhD students and postdocs within my group. Besides, I supervised five Master's theses (all graded above 9), one Bachelor's thesis, and two research internships. Several of these students—Teresa, Asier, Gonzalo, and Claudia—have continued as PhD researchers in my group, underscoring my ability to mentor and retain talent. My research contributions to biohybrid engineering include biophysical models to probe protein-environment interactions and novel approaches for protein assembly. These findings have been published in 21 peer-reviewed articles, with 11 in which I am the first author, 3 in which I am the corresponding author, and 2 invited book chapters. Recognitions include the 2023 AntalGenics Prize from the Spanish Society of Biophysics (SBE) and listing in the 2024 FECYT database as a leading scientist in biohybrids.

Committed to mentoring, I funded the seminar series on ultrafast phenomena at the nanoscale programme and supported the creation of the first spectroscopy PhD course at IMDEA. I also launched "Science Day" in my group to foster discussion and critical thinking, and I have recently been part of the mentorship program of the SEBBM society. I have been part of commissions of trust, including serving on three PhD committees and evaluating master's theses at various universities. I have evaluated competitive fellowships and research projects, including HFSP funding, MSCA COFUND grants (MFP-2021, IDEAL-2025), Generación de Conocimiento proposals from the Spanish Ministry of Science, and grants from the National Science Center of Poland. I actively engage in science dissemination, contributing to 33 international conferences (including 25 oral and invited talks). I also participate



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

in outreach activities, including publishing a popular science article in MUY INTERESANTE. Through research, mentorship, and outreach, I aim to advance the field of biohybrid nanophotonics and inspire future scientists



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: DEL SANTO, FLAVIO
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Título: From conceptual foundations of quantum theory to applications

Resumen de la Memoria:

My research develops at the interface between the conceptual foundations of physics and the operational methods of quantum information theory. A recurring theme in my work is the attempt to understand how information, measurement, and time enter the physical description of the world, and how foundational insights can guide new information-theoretic applications. This dynamic interplay has shaped a program supported by major competitive funding, carried out at prestigious international institutions.

My trajectory unfolds along three interconnected research lines. The first concerns quantum information taken both as an operational theory and as a laboratory for concepts. I have contributed to establishing quantum coherence as a genuine communication resource. The protocol now known as the Del Santo-Daki scheme provided the first explicit use of single-particle coherence to enhance classical communication, doubling the bandwidth of standard encodings and inspiring new cryptographic applications (secure, anonymous, direct communication). More recently, my work has focused on the structure of joint quantum measurements, where I helped develop the first entanglement-based classification of nonlocal measurements and the notion of localisable measurements, which clarifies long-standing inconsistencies surrounding “impossible” measurements in quantum field theory. These tools connect resource-theoretic perspectives with the operational needs of quantum networks and provide new ways to characterise nonlocality beyond standard Bell scenarios.

The second line addresses the quantum measurement problem and the role of observers. I have pioneered extended Wigner’s friend scenarios, where I introduced a timeless operational framework that allows one to analyse nested or sequential observers without presupposing an external classical time parameter. This has led to new no-go results limiting the consistency of quantum predictions when observers themselves are treated quantum mechanically. These contributions have helped define a rapidly developing research direction linking quantum information, logic, and foundational questions about agency and perspective in quantum theory.

The third line concerns the nature of indeterminacy and the status of probability in physical theories. There, I have developed the first consistent framework for ontic indeterminism in classical physics, where classical quantities carry only finite information. This approach undermines the usual identification of classical physics with determinism, produces an explicitly indeterministic classical dynamics, and has implications for the philosophy of time and for the classical-quantum boundary. It has also created a methodological bridge between physics and intuitionistic mathematics, opening a new conceptual space for rethinking probability and information in both classical and quantum settings. This line of work has sparked considerable debate in the community of foundation of physics and foundations of probability.

Across these strands, my research moves between the search for conceptual clarity and the development of operational consequences. The resulting program treats foundational problems and information-theoretic tasks not as separate enterprises but as mutually reinforcing methods for understanding how physical theories encode, process, and constrain information.

Resumen del Currículum Vitae:

I am a theoretical physicist with recognized contributions to quantum foundations, quantum information science, and the conceptual analysis of physical theories, as well as in the history and philosophy of physics. I completed my Bachelor’s in Physics and Astrophysics at the University of Florence, and both my Master’s and PhD in theoretical physics at the University of Vienna and IQOQI-Vienna. I have since held postdoctoral positions at the University of Geneva and the University of Vienna with a Schrödinger Fellowship. My career has been funded exclusively through competitive grants that I independently conceived, prepared, and secured, amounting to approximately €720,000 (OeAW DOC Fellowship, FWF Schrödinger Fellowship, VDS-P Mobility Fellowship, and a shared FWF Personal Investigator grant).

I have authored 41 research papers, including 33 articles in leading peer-reviewed journals, with around 700 citations. Among these, only 4 are co-authored with my PhD supervisor, 9 are single-author papers, and the others are co-authored with 30 different scholars from Austria, Switzerland, Spain, Poland, the US, Serbia, China, Brazil, and Italy. I have undertaken research stays at Oxford, Jagiellonian University in Kraków, Dartmouth College, the University of Belgrade, and the MPIWG in Berlin, and have given 41 invited talks at leading research institutions and international conferences, including ICFO, IQOQI-Vienna, Oxford, IISER-Kolkata (plenary), and the APS April Meeting.

My work spans quantum coherence as a communication resource, indeterministic models of classical physics, Wigner’s friend scenarios, and the theory of joint quantum measurements. Some of these results have become reference points in quantum foundations, earning an FQXi Prize and an APS Best Paper Award, and have been featured in popular science venues like Scientific American, Quanta Magazine, Le Scienze, Epsilon, Der Standard, Phys.org, and The Atlantic.

I have supervised several Master’s theses and co-supervised PhD projects. For five years, I have taught courses on quantum information, quantum cryptography, and quantum computation, including laboratory components, at the University of Applied Sciences of Vienna.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have organized 25 international academic events on quantum foundations and quantum information (e.g. Foundations of Quantum Physics beyond Bell: Celebrating 60 Years of Bell's Theorem (Switzerland, 2024), Varieties of Indeterminism (Switzerland, 2023)), as well as events on the drawbacks of academia (scientific publishing and grant systems) and on inclusivity (Austrian Conference on Women in Physics).

I have also developed a strong profile in community building and outreach. I have served as representative of the Vienna Doctoral School of Physics, Vice-Chair of the Basic Research Community for Physics, national representative for Switzerland in the COST Action on Relativistic Quantum Information, and permanent member of the steering committee of the international conference series Foundations of Physics. I have been guest editor for EPJ H and referee for leading journals (PRL, PRX family, Quantum, Found. Phys., Eur. J. Phil. Sci., among others). I regularly engage in third-mission activities, including public lectures in city squares, curating a history and foundations blog for IQOQI@Vienna, and participating in art@science initiatives.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
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Título: Nuclear-weak interactions probing beyond standard model physics

Resumen de la Memoria:

The aim of my research is to use atomic nuclei as test laboratories to shed light on fundamental physics questions, such as the unknown nature of neutrinos and possible existence of physics phenomena beyond the Standard Model of particle physics: “What are the masses of neutrinos?”, “Are neutrinos their own antiparticles?”, “How to explain the matter dominance of the Universe?”. Neutrinoless double-beta (0nbb) decay is a particularly powerful probe for these phenomena and has hence been in the core of my research.

Since many potential standard-model-violating phenomena involve atomic nuclei, nuclear-physics input is essential in the beyond-standard-model physics (BSM) searches. I aim at describing atomic nuclei as well as possible using suitable phenomenological methods or state-of-the-art ab initio techniques when possible. In contrast to phenomenological approaches, the ab initio nuclear methods, such as the no-core shell model (NCSM) and the in-medium similarity renormalization group (IMSRG) that I use, are systematically improvable techniques allowing for robust uncertainty quantification. On the other hand, phenomenological methods, such as the quasiparticle randomphase approximation (QRPA) and nuclear shell model that I have used in my research, are often capable of describing a wider variety of nuclei with less computational power.

I plan to improve my previous studies on muon capture and 0nbb decay by including momentum-dependent two-body currents that recently became available from an effective-field-theory analysis. These currents, though formally at a sub-leading order in the theory have been shown to potentially have a significant effect on the observables. Currently, all nuclear matrix elements for 0vbb-decay candidates on the market lack these currents, and this study will improve the current theory predictions.

Furthermore, I plan to study exotic bb-decay mechanisms. While the most commonly studied scenario includes an exchange of a light neutrino between the two decaying nucleons, many other mechanisms, such as sterile-neutrino or scalar exchange, are also possible. Since experiments can only detect the emitted electrons, reliable nuclear-theory predictions are needed in order to infer the decay mechanism and to interpret the data correctly. I plan to compute the nuclear matrix elements needed for these mechanisms in the ab initio VS-IMSRG framework.

On the other hand, I plan to extend my research into new directions. I plan to study neutrino-nucleus scattering using similar ab initio techniques as in my muon-capture studies. Theory predictions for the related cross sections are crucial for neutrino experiments, such as DUNE, MINERvA, NOvA and T2K, whose detection techniques rely on these processes. I plan to improve previous predictions for medium-energy exclusive scatterings off light nuclei in the ab initio NCSM framework, and to extend the calculations also to inclusive scatterings using the Lanczos strength function method.

Finally, I plan to extend my ongoing ab initio studies on forbidden beta decays to nuclei relevant for the astrophysical r-process path responsible for forming heavy elements. I currently study forbidden beta decays for precision experiments aiming at discovering beyond-standard-model signals. The same framework can be used to study neutron-rich nuclei relevant for the astrophysics simulation.

Resumen del Currículum Vitae:

I am a Herzberg Fellow (5-year, non-tenure track position) at the Technical University of Darmstadt (TUDa) since April 2025. My research focuses on understanding the structure and properties of atomic nuclei and shedding light on fundamental physics questions, like the unknown nature of neutrinos and possible existence of physics phenomena beyond the Standard Model (BSM) of particle physics. Nuclear-weak interactions that can probe BSM physics, such as neutrinoless double-beta (0nbb) decay, are my key research interests. I use both phenomenological and ab initio nuclear many-body methods depending on the purpose.

My work is internationally acknowledged, with h-factor=12 (Google Scholar (GS), 01/12/2025) and has increasing impact in the field: 439 citations (GS) of which 37 in 2021, 82 in 2023 and 124 in 2025 so far. I have published 18 peer-reviewed articles (incl. 5 letters). I have presented 22 invited and 9 contributed talks in international conferences and workshops and 22 invited colloquia and seminars and have organized two international workshops. I have been awarded two prizes on my talks.

I obtained my PhD in Physics with the grade “Pass with distinction” from University of Jyväskylä (JYU). My PhD work established new ways to probe the poorly constrained nuclear matrix elements (NMEs) of 0nbb decay by experimental data on charge-exchange reactions and muon capture and has been cited more than 150 times. My work triggered the MONUMENT collaboration to perform muon-capture measurements in double-beta decay nuclei at the PSI in Switzerland.

I had my first postdoctoral position at the University of Barcelona (UB) in 2021-2022, where I studied new ways to probe 0nbb decays by nuclear observables. We found that the NME of 0nbb decay is correlated with its standard-model allowed version, two-neutrino bb decay, and were able to use data to constrain the NMEs of 0nbb decay. We also studied the effect of corrections from chiral effective field theory on the NMEs of 0nbb decay. The effect of a new leading-order contact term turned out to be particularly important, and this work has gained a lot of interest (and 60+ citations) from the community. Before starting at TUDa, I was a postdoctoral fellow at TRIUMF, Canada’s Particle Accelerator Centre, in 2022-2025. There I studied nuclear-electroweak interactions, such as muon/electron capture on nuclei, forbidden b decay and bb decay, from first principles using ab initio nuclear theory.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

At the UB, I was the PI of a 1-year research grant awarded by the Finnish Cultural Foundation. At TRIUMF, I was funded by the HQP Pooled Resources of the Arthur B. McDonald Canadian Astroparticle Physics Research Institute through an application in which I was the co-applicant with the PI Dr. Jason D. Holt. I have co-supervised four undergraduate students at the UB and at TRIUMF.

At JYU, I was a teaching assistant for undergraduate courses on Quantum Mechanics (2020), Thermodynamics and Optics and Fundamental Mechanics (2017-2019). I have done high-school visits in Finland and co-organized a science camp for high-school students and European Researchers' Night at JYU in 2016-2019. I review for Phys. Rev. Lett., Phys. Rev. C, Phys. Rev. Res., Phys. Lett. B, and Nucl. Phys. A. I also review applications for the Rising Researchers' Seminar series and for the Arthur B. McDonald Institute's HQP Pooled Resources competition.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: REINA CAMPOS, MARTA
Referencia: RYC2025-055731-I
Correo Electrónico: reinacampos@cita.utoronto.ca
Título: GALACTIC EVOLUTION DRIVEN BY MASSIVE STAR CLUSTERS
Resumen de la Memoria:

I am an astrophysicist expert in star formation and feedback, galaxies, and cosmology. My research focuses on star clusters and their connection to their host galactic environments across the history of the Universe, using a combination of theoretical, numerical and observational techniques.

Over the years, I have carried out an innovative research programme resulting in major contributions to the field: (i) I have demonstrated that only detailed modeling of the physics of the interstellar medium is crucial to reproduce the properties of globular clusters in the Milky Way, (ii) I have developed the first cosmological zoom-in simulations of galaxies that incorporate a sub-grid description of star clusters, (iii) I have shown that massive star clusters are excellent tracers of the underlying dark matter distribution in their host galaxies, and (iv) I pioneer the characterisation of bright star cluster populations in galaxy clusters using deep JWST imaging.

To carry out this research, I have built, led and regularly contributed to several international collaborations that have members across North America, Europe, and China. This has been possible thanks to my initiative, independence and international visibility, built at top-profile institutions in Europe and North America. My work has been published in 42 refereed publications, with >1700 citations and a current h-index of 22 according to the NASA/ADS Database. As a result of my visibility, I have been invited to give 5 keynote talks at international meetings and to present my work at 33 academic institutions across the globe (e.g. the US, UK, Germany, Switzerland). My theoretical and numerical expertise has allowed me to contribute to four Cycle 5 JWST observing proposals (~210 hours), whose aim is to expand the sample of galaxy clusters at redshifts $z \sim 0.2 - 0.9$ with wide and deep NIRC2 imaging in multiple bands. This will allow us to investigate how star cluster formation and evolution occurs in the second half of the lifetime of the Universe.

I have been an independent researcher since the beginning of my scientific career. From my upcoming fellowship at the Universidade de Santiago de Compostela back to my PhD studies at Universitaet Heidelberg, I have been able to secure funding for myself via competitive and prestigious fellowships (total attracted > 2.6M EUR). My independence and international network of collaborators have allowed me to co-organise 7 international meetings located in Europe and Canada, for which I have secured funding from several competitive calls (total 14k EUR).

As a Ramón y Cajal fellow, I will build an intertwined model of the co-evolution of star clusters and galaxies over cosmic time. In particular, I will seek to (a) study the impact of clustered feedback on the evolution of galaxies, (b) investigate the fate of star clusters within galaxies over time, (c) map the distribution of dark matter with bright star clusters. I will do so by connecting advanced numerical simulations of galaxy formation with deep multi-wavelength observations. By exploring these wide range of topics, my work will shed light on the small-scale physics driving the evolution of galaxies and their stellar constituents over cosmic time.

Resumen del Currículum Vitae:

I am a Canadian Institute for Theoretical Astrophysics (CITA) Canada Postdoctoral Fellow at McMaster University and at CITA, and I am an expert in galaxy formation, the interstellar medium and star formation and feedback.

Scientific Trajectory: I was awarded a competitive fellowship by the International Max Planck Research School to carry out my PhD studies at the Ruprecht-Karls Universitaet Heidelberg under the supervision of Diederik Kruijssen between 2016-2020. My thesis received a "Summa cum laude" grade, and upon graduation, the Faculty of Science of the Universitaet Heidelberg awarded me the Wilma-Moser-Prize 2020. My thesis was also a nominee for the 2021 Wilhelm und Else Heraeus-Dissertationspreis für Physik und Astronomie, and it received a special mention in the 2021 best PhD thesis award from the Spanish Astronomical Society. Since January 2021, I have held a prestigious 5-year CITA Canada Postdoctoral Fellowship at McMaster University and CITA. Starting in February 2026, I will lead a new area in Theoretical Astrophysics as a Global Talent Junior Fellow at the Instituto Galego de Física de Altas Enerxías.

Publication Record: My work has been published in 42 refereed articles, out of which 12 are first authored. According to the NASA/ADS Database, these articles have been cited >1700 times, and my current h-index is 22. I have been invited to give 5 keynote talks at international meetings, and to present my work at seminars and colloquia in 33 academic institutions across the globe (including high-profile institutions like Harvard, Princeton, Carnegie and Zurich). I have also contributed a total of 24 talks at international conferences.

Research support: Throughout my career, I have been able to secure funding for myself via prestigious and competitive fellowships (total of >2.6M EUR), as well as to fund trips and conferences from a variety of sources (total of 14k EUR).

Contribution to the community: I have co-organised a total of 7 international meetings located in Canada and Europe. In addition, I regularly participate as a peer reviewer at the main journals in my field (MNRAS, A & A, ApJ), and I am an experienced reviewer of observational and high-performance computing proposals: I have reviewed for the UK STFC Council DiRAC High Performance Computing facilities, for the ADAP21 programme from NASA and for the JWST Cycle 4 funding programme by the Canadian Space Agency.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Teaching and supervision: I have experience working with undergraduate and graduate students on projects of varying scope and complexity. I have co-supervised three undergraduate research theses, three undergraduate summer research projects, and I also have closely worked with a graduate student. Two of these student-led projects produced publications that have been accepted MNRAS.

Summary: Since starting my PhD, I have output novel and high-impact research articles (>1700 citations), and I have attracted (>2.6M EUR) funding to finance my research. I have experience mentoring students (3 summer students, 3 BSc), and I am an active member in my department and my community, organizing journal clubs, conferences, seminars, and participating in proposal review committees. Over the years I have built an extensive network of collaborators, and I lead and contribute to several international collaborations.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: MATEOS, DIEGO
Referencia: RYC2025-054607-I
Correo Electrónico: mateosdiego@gmail.com
Título: PhD Physics

Resumen de la Memoria:

My trajectory lies at the intersection of physics, mathematics, and neuroscience, with the goal of developing analytical tools capable of unveiling the hidden dynamics governing brain activity. This interdisciplinary perspective has enabled me to design innovative methods that extract mechanistic information from neurophysiological recordings and contribute to a deeper understanding of normal and pathological brain function.

My first research line focuses on advanced analytical methods for complex systems applied to neural data. I work across three complementary frameworks. First, I investigate nonlinear properties of neural signals through information-theoretic tools such as entropy, divergence measures, and complexity metrics. Second, I analyse multidimensional interactions using complex network theory to characterize functional and structural connectivity patterns. Third, I incorporate higher-order information measures based on algebraic topology, hypergraphs, and simplicial complexes, moving beyond pairwise analyses to capture collective interactions that shape neural dynamics. These approaches reveal features undetectable with conventional analyses. Complementing this theoretical foundation, I integrate deep learning models—including CNNs, GNNs, and explainable AI methods—to achieve interpretable prediction, classification, and prognosis in clinical settings.

My second research line investigates brain dynamics across scales, integrating microscopic signals (ion currents, spiking activity) with mesoscopic recordings (HD-MEA, LFP, ECoG, iEEG) and macroscopic neuroimaging (EEG, MEG, fMRI). The objective is to uncover the physical and computational principles underlying cognitive states—wakefulness, sleep, anaesthesia, seizures—and to determine how these mechanisms deteriorate in disorders such as epilepsy, Alzheimer's disease, Parkinson's disease, multiple sclerosis, and traumatic brain injury. This work combines animal models and human datasets, supporting both mechanistic insight and translational applicability.

Both lines are highly transdisciplinary and supported by a robust international network of collaborations with experimental laboratories, clinical teams, and neuroimaging centers across Europe and the Americas. I have secured and curated large multimodal datasets, including HD-MEA, LFP, iEEG, EEG, and fMRI recordings, which serve as the foundation for current and future projects. I am also committed to reproducible science through the development of open-source software and methodological pipelines that are already being used by collaborators. In parallel, I supervise early-career researchers, co-direct doctoral projects, and participate in multidisciplinary initiatives that integrate computational modelling, medical data analysis, and advanced machine learning.

Altogether, the combination of theoretical physics, applied mathematics, machine learning, and experimental neuroscience supports a coherent and competitive research program. This integrated approach strengthens my leadership capacity and consolidates a solid, independent research line aimed at producing fundamental knowledge and clinically relevant tools for understanding and modulating brain activity.

Resumen del Currículum Vitae:

I received my Ph.D. in Physics from the Universidad Nacional de Córdoba (Argentina) in 2015. I then completed a postdoctoral stay in neuroscience at SickKids Hospital in Toronto (Canada), where I strengthened my training in neurophysiology and translational research. In 2018, I was awarded a postdoctoral fellowship from the National Scientific and Technical Research Council (CONICET, Argentina) and subsequently became Associate Professor at the Universidad Autónoma de Entre Ríos. In 2019, I obtained a tenured position as Adjunct Investigator (PI) at CONICET and founded the Neuroimage Analysis Group at the Instituto de Matemática Aplicada del Litoral (IMAL-CONICET-UNL), currently composed of four Ph.D. candidates, one postdoctoral researcher and a technician.

In 2023, seeking to consolidate my expertise in experimental neuroscience, I was selected for a High-Throughput Computing and Artificial Intelligence IKUR contract and joined the 3ND group of Dr. Encinas at the Achúcarro Basque Center for Neuroscience, where I am currently based. This stay has reinforced my involvement in experimental design, optimization of electrophysiological acquisition pipelines, and the development of analytical methodologies aligned with clinical and experimental needs.

I have demonstrated strong leadership as PI in project conception, implementation, analytical development and team coordination, while fostering collaborations with experimentalists, clinicians, and psychologists. I maintain an active international network with groups in Argentina, Mexico, Spain, Italy, USA, France, UK, Brazil, Canada and Uruguay, and have established partnerships with BrainCanada, Neureka and ACCURE Therapeutics. I have participated in 21 funded research projects, serving as PI in three and as a key collaborator in the remainder. I have also completed research stays in eight international laboratories across Uruguay, Argentina, France, Canada, Chile, and Spain.

Furthermore, I have authored 39 peer-reviewed publications in high-impact journals, being first or co-first author on 14 papers and last author on eight, demonstrating independence and leadership. I currently have four manuscripts under review (three as last author). I have delivered 21 talks (nine invited) and participated in 57 conferences. I have secured three Ph.D. fellowships, three postdoctoral fellowships and three international mobility grants. Likewise, I have supervised 10 completed M.Sc. thesis, four Ph.D. theses (two under evaluation, two ongoing), and one postdoctoral researcher funded by CONICET.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My teaching experience includes serving as teaching assistant at the University of Toronto (2016), Adjunct Professor at UADER (2018–2022), and lecturer/mentor in final-project courses and data-science diplomas at FCEFyN and FaMAF (Universidad Nacional de Córdoba). I regularly review for high-impact journals (including Brain, Chaos, Physical Review E, Cortex, and Frontiers) and have participated in thesis committees and national evaluation panels. I also engage in outreach through school-based science programs, IMAL Open Doors, and Achucarro – Neuroscience Day, promoting the public understanding of neuroscience.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: BRUNO , NATALIA
Referencia: RYC2025-055734-I
Correo Electrónico: nat1707@gmail.com
Título: Experimental quantum optics with light and atoms
Resumen de la Memoria:

My scientific career lies at the intersection of quantum optics, atomic physics, and photonics. After graduating in Physics at the University of Rome *La Sapienza*, I earned a PhD at the University of Geneva under the supervision of Prof. Nicolas Gisin, a pioneer of quantum communication. During this period I developed sources of entangled photon pairs at telecom wavelengths for quantum information and fundamental studies on the quantum-to-classical transition. A highlight was the demonstration of a micro-macro entangled optical state involving up to 500 photons, published in *Nature Physics*.

As a Marie Skłodowska-Curie ICFOnest+ Fellow at ICFO (Barcelona), I started a new experimental line within the Atomic Quantum Optics group led by Morgan Mitchell, building from scratch a single-atom apparatus based on a high-numerical-aperture *Maltese-cross* optical trap for individual 87Rb atoms. This platform enabled coherent light-matter interaction studies at the single-particle level and connected the atomic and photonic quantum communities.

Since 2019, as researcher at the National Institute of Optics (CNR-INO, Florence), I have introduced quantum-optics methods into semiconductor systems within the EU Quantum Flagship project QOMBS, realizing the first mid-infrared balanced-homodyne detector for squeezed-light detection.

During this time I was awarded the *L'Oréal Italia* for Women in Science (2021) and *L'Oréal UNESCO International Rising Talents* (2022) awards.

Currently I am a permanent researcher at CNR-INO and lead the Yb-Cavity Lab at LENS (Florence). I coordinate an activity within the national project I-PHOQS (Activity 5.3 *Matter-Light Quantum Interfaces*) and a work package in the ASI-CNR joint lab QASINO (WP5100 *Infrared Sources for Quantum Sensing and Communication*). My present research aims to develop an interface between a single 171Yb atom and resonant single photons at telecom wavelengths to generate atom-photon entanglement and quantum-network links between distant nodes.

171Yb can store quantum information as a ground ($1S_0$) or as metastable ($3P_0$) spin state superposition. These two states are linked by an ultra-narrow ($<1\text{ Hz}$) clock transition which enables not only manipulating the spin, but also resolving and controlling the motional states with simple laser driving. A central goal of my research is to extend the lifetime of atoms in optical traps, a crucial parameter for scalability in quantum networks.

This research combines cavity-QED, optical-tweezer and squeezed-light techniques to extend atomic coherence and realize scalable hybrid quantum architectures. Beyond quantum communication it opens routes toward quantum sensing and precision metrology. My long-term vision is to integrate atomic and photonic systems into interoperable, sustainable quantum networks considering technological and societal impact.

Resumen del Currículum Vitae:

Tenured Researcher, Department of Physics and Matter Science, National Institute of Optics of the National Research Council (CNR-INO) Italy

Research keywords: Quantum technology, quantum networks, cold atoms, quantum communications, quantum optics, photonics, entanglement, cavity QED.

I have published 19 papers in peer-reviewed journals, I have an h-index of 16 and 853 citations on scholar.

Languages: English (fluent), Italian (native), Spanish (fluent), French (good), Catalan (basic), Portuguese (basic)

2022-present PI of the Yb-cavity lab
(<https://quantumgases.lens.unifi.it/exp/yb-cavity>, <https://sites.google.com/lens.unifi.it/patlab/>)

2023-present Chair of the EuroQCI Thematic Working Groups (ETWG) on Use Cases in the EuroQCI coordination and support action PETRUS.

2023-present WP leader within the project QASINO (Italian Space Agency $\oplus$ National Institute of Optics ASI-INO joint labs) and PI the Activity *Matter-Light Quantum interfaces* within the I-PHOQS project (Integrated infrastructure initiative in photonic and quantum sciences).

2021- 2024 PI and Course Director of PhotonHUB Europe Demo Centre on Quantum Communication

2024-present Teaching *Modern experiments in quantum optics and quantum information* at University of Trieste, course for PhD students.

Previous positions

2019 - 2022 Fixed-term Researcher

Department of Physics and Matter Science, National Institute of Optics of the National Research Council, Italy

2017 $\oplus$ 2019 Postdoc ICFO $\oplus$ The Institute of Photonic Science, Spain, Morgan Mitchell

2015 $\oplus$ 2017 ICFOnest+ Marie Skłodowska-Curie Actions (MSCA) Cofund Fellowship for outstanding post-doctorate researchers ICFO $\oplus$ The Institute of Photonic Science, Spain, Morgan Mitchell

2015 $\oplus$ 2015 Postdoc Faculty of Sciences, Physics Department, University of Geneva, Switzerland Nicolas Gisin



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Education

- 2015 PhD in Physics, University of Geneva, Switzerland. Supervisor: Prof. Nicolas Gisin; Thesis: Single photon entanglement: from foundations to applications.
- 2010 Master Degree in Physics, 110/110 cum Laude, Sapienza University of Rome, Italy; Supervisor: Prof. Paolo Mataloni;
- 2008 Bachelor Degree in Physics, 110/110 cum Laude, Sapienza University of Rome, Italy; Supervisor: Prof. Paolo Mataloni;

Peer recognition

- 2023 ERC Visiting Fellowship of the European Research Council (VFP ERC) ☐
- 2022 Award ☐2022 L'Oréal-UNESCO For Women in Science International Rising Talents☐ (IRT). Institutions: Fondation L'Oréal and the The United Nations Educational, Scientific and Cultural Organization UNESCO (15k ☐).
- 2021 Award ☐L'Oréal Italia per le donne e la scienza☐ (L'Oréal Italy for women in science). Institutions: L'Oréal Italia in collaboration with the Italian National Commission for UNESCO
- 2021 Member of Gender Equality Plan Committee, LENS, University of Florence, Italy
- 2020+ Member of the the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) Focus Group for the Standardization of Quantum Technologies (2020-2021).
- 2018-19 Member of ICFO Postdoc Committee, ICFO, Spain
- 2018-19 Member of ICFO Gender Committee, ICFO, Spain



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: BUONOCORE, LUCA
Referencia: RYC2025-056595-I
Correo Electrónico: luca.buonocore@cern.ch
Título: Senior Research Fellow

Resumen de la Memoria:

My research activity is focused on high-energy particle physics and collider phenomenology, with the goal of providing high-precision theoretical predictions for processes relevant to the CERN Large Hadron Collider (LHC) and future collider facilities. My work addresses a central challenge of modern particle physics: matching the increasing experimental precision with equally accurate and reliable theoretical calculations, in order to test the Standard Model at the percent level and uncover potential signals of new physics.

My scientific trajectory has been characterized by a strong methodological component and by the progressive development of an independent research profile. I specialize in higher-order perturbative calculations in quantum field theory, in particular NNLO QCD and mixed QCD-electroweak corrections, which are essential for precision measurements at the LHC. I have contributed to and led state-of-the-art predictions for benchmark processes such as Drell-Yan dilepton production, associated production of top-quark pairs with electroweak bosons, and multi-jet observables, including results published in Physical Review Letters. These studies directly impact the interpretation of collider data and the constraints on physics beyond the Standard Model.

During my PhD and postdoctoral experience between the University of Naples, the University of Zurich, and CERN, I initiated and developed original research lines combining analytic developments and advanced numerical techniques. This includes extensions of non-local subtraction methods, the determination of lepton parton distribution functions and their phenomenological applications, and the study of signatures of light dark matter at beam-dump and neutrino experiments. More recently, I have proposed new resolution variables ($k_{t\text{-ness}}$) and transverse-momentum-like observables for complex final states, enabling novel NNLO calculations and resummation strategies.

Since 2023, as a Senior Research Fellow at CERN, I have further consolidated my research program toward very high precision for processes with complex final states, including top-quark production with leptonic decays and off-shell effects. In parallel, I have expanded my expertise to resummation and effective field-theory approaches, including mixed QCD-QED resummation and automated numerical resummation of jet observables. A significant outcome of my work is the development of publicly available computational tools implemented in widely used Monte Carlo frameworks, such as POWHEG, MATRIX, and MadGraph, ensuring a lasting impact on both theory and experimental analyses.

My future research line aims to establish a coherent and internationally visible program in precision collider phenomenology, combining fixed-order calculations, resummation, and effective field theories for LHC and HL-LHC physics, while maintaining strong links with intensity-frontier experiments. Within the Ramón y Cajal program, I plan to consolidate an independent research line, train young researchers, and contribute actively to strengthening the Spanish high-energy physics community and its international leadership in precision particle physics.

Resumen del Currículum Vitae:

I am a theoretical particle physicist with a strong international profile, specializing in high-energy and intensity-frontier physics. I completed a joint PhD between the University of Naples and the University of Zurich (2017-2020), where I initiated independent research directions and developed original methods for high-precision predictions in collider phenomenology.

After my PhD, I held a postdoctoral position at the University of Zurich (2020-2023), where I expanded my research to multi-jet and heavy-quark processes, developed computational tools, and co-mentored three PhD students. I was awarded competitive funding, including a one-year Forschungskredit fellowship (~100 kCHF) and a Horizon-MSCA Seal of Excellence.

Since October 2023, I have been a Senior Research Fellow at CERN, collaborating with leading theorists on ERC-funded projects and strengthening links between theory and experiment. I organize the weekly QCD Seminars and the "Collider Cross Talk" series and served as local organizer of the Parton Showers and Resummation 2025 (PSR25) conference. I have delivered invited and plenary talks at major international conferences, such as SM@LHC, RADCOR, Loops & Legs, Rencontres de Moriond, and Rencontres de Blois.

I actively contribute to open science by releasing publications, datasets, and computational tools through public repositories and participate in peer review for leading journals. I have extensive teaching and mentoring experience, supervising Bachelor and Master theses, co-mentoring PhD students, and leading lectures and discussion sessions at international schools, including the European School of High-Energy Physics and the Advanced School & Workshop on Multiloop Scattering Amplitudes.

My career reflects strong international mobility and collaboration, with research visits to Louvain-la-Neuve, extended periods at the University of Zurich, and my current position at CERN. Through independent research, leadership in computational and methodological developments, and active engagement in the scientific community, I have established myself as an emerging leader in theoretical particle physics, ready to contribute to and strengthen the Spanish research system.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: EL MELLAH NA, ILEYK
Referencia: RYC2025-055102-I
Correo Electrónico: ileyk.elmellah@upc.edu
Título: Accreting compact objects at all scales - From X-ray binaries to supermassive black holes

Resumen de la Memoria:

My research focuses on stars and compact objects (neutron stars NSs, and black holes BHs), and the high-energy phenomena due to their interactions with their environments. I investigate accretion and ejection processes, radiation-matter coupling and particle acceleration through magnetic reconnection. My work spans stellar-mass compact objects in X-ray binaries (XBs) and supermassive BHs in galactic nuclei. I pay a specific focus to high-mass XBs since they are thought to be progenitors of double compact object mergers.

I have studied stellar wind mediated mass transfer in XBs, showing that contrary to earlier beliefs, an accretion disk can form around a NS, beyond the magnetosphere. Using multi-scale magneto-hydrodynamic (MHD) simulations, I revealed the dynamics of wind-capture disks and their impact on NS spin evolution. These insights challenged traditional accretion torque models and spurred collaborative projects, such as the ISSI-funded "Feeding the Spinning Top," to investigate plasma-magnetosphere coupling. For BHs, I developed 3D particle-in-cell (PIC) simulations in curved spacetime to explore relativistic magnetospheres. My work highlighted how reconnecting magnetic field lines heat plasma and accelerate particles, forming magnetic islands (plasmoids) susceptible to account for the non-thermal flares observed from the supermassive BH Sagittarius A* at the Galactic center. I provided new constraints on its spin and made synthetic observables for future EHT and GRAVITY observations.

I leverage the world-class instruments across the full electromagnetic spectrum to put my numerical results to the test and provide insightful data interpretation. I lead observational campaigns aimed at studying the high-energy phenomena at play in XBs (e.g. jet emission with ALMA), in coordination with X and gamma-ray satellites. I am also an active member of multiple large-scale observational programs aimed at symbiotic binaries (wind free-free emission from T CrB with ALMA) and cool evolved stars (ATOMIUM collaboration). In these systems, I showed that we can exploit spectro-imaging to constrain the wind and companion properties. I also characterized clumpy winds from hot stars through radiative-HD simulations, uncovering their role in high-mass XBs' variability.

My future work will tackle critical questions in the evolution of compact objects. First, I aim to identify quiescent BHs through non-thermal emission and indirect signatures imprinted in stars' winds. Then, I aim to understand the mechanisms driving spinning up/down of NSs in high-mass XBs by simulating interactions with the plasma their stellar companion provides. I plan to design a hybrid PIC/MHD approach to capture dissipative effects with unprecedented accuracy. Finally, I will investigate mergers of compact objects, focusing on the remnants they leave behind. My work will address key questions such as the lifetime of supermassive NSs, their collapse into BHs and electromagnetic precursors. I will model magnetospheric interactions and produce synthetic observables to make the most of the upcoming new generation of gravitational wave interferometers. By synthesizing advanced computational methods with observational diagnostics, these projects will provide transformative insights into compact objects, their environments and their role in the broader context of cosmic evolution.

Resumen del Currículum Vitae:

Since late 2025, I am a lecturer at Universitat Politècnica de Catalunya in the group of Astronomy and Astrophysics. Between 2023 and 2025, I was an assistant professor at Universidad de Santiago de Chile, where I raised 240,000 euros in external fundings to build my own team with 1 PhD student and 2 postdocs being transferred to Spain.

My academic journey began with a 3-year PhD at the Astroparticle and Cosmology laboratory in Paris, where I defended my PhD on wind accretion onto compact objects in September 2016. A few months later, while in KU Leuven with R. Keppens, I was awarded a Marie Skłodowska-Curie fellowship to carry out my own research project on X-ray binaries. In parallel, I worked on stellar winds with L. Decin and J. Sundqvist at the Institute of Astronomy of KU Leuven. In 2020, I joined B. Cerutti in Grenoble to develop my expertise in general relativity and collisionless plasmas. These experiences enabled me to develop a versatile skill set in computational astrophysics, including magneto-hydrodynamic and particle-in-cell simulations, to model complex plasma behaviors. I am both a code developer, who implements free and open source new algorithms to speed up the simulations and new physical ingredients to make them more realistic, and a user interested in specific astrophysical applications.

Through my career, I have closely confronted my models and observations. I led or co-founded working groups (e.g. X-wind collaboration in 2018, ISSI team in 2023) to leverage the new diagnostics I found in numerical simulations: it enabled us to set new constraints on binary evolution, compact objects and particle acceleration (e.g. by measuring stellar wind properties, mass transfer rates and non-thermal spectra). I carry my own observational campaigns in Chile with the VLT (4 accepted X-SHOOTER and UVES proposals as PI in calls P114 and P115), ALMA and SOAR, and I have secured significant amounts of computing time on world-renowned facilities like the VSC, GENCI and DiRAC supercomputers. It has enabled me to perform sophisticated simulations based on high-performance computing techniques such as adaptive grids and hybrid CPU/GPU parallelization. I have been deeply involved in observational campaigns in X-ray (XMM, NICER), optical (SPHERE) and radio (large ALMA program ATOMIUM, joint VLA/ALMA, MeerKAT) to support data interpretation. I participate in international consortia for future high-energy instruments (Plasma Observatory). My publication record (43 publications, 1,731 citations, H-22) and the multiple international conferences I have organized or where I presented my results vouch for my active involvement in the community.

In Leuven, I co-supervised the 2018-22 PhD of N. Moens on radiative-hydrodynamic simulations of massive star winds. Currently, I am the main supervisor of a PhD student exploring particle acceleration in black hole magnetospheres (graduation in 2027), a postdoc on relativistic jets from



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

compact objects and a postdoc on Be stars in X-ray binaries. Last, I have mentored multiple Master students, with most of them yielding at least a publication. Beyond research, I have extensive teaching experience, as a lecturer (5 courses) and as a teaching assistant (5) over the past 12 years, and I am deeply committed to outreach with a book on black holes, educational videos and podcasts, and multiple public talks.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: CORTESE, LORENZO
Referencia: RYC2025-055386-I
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Título: Diffuse optics for health

Resumen de la Memoria:

My contributions in research span disciplines unified by the general physical model of photon diffusion physics, from basic science (PhD research), to medical applications.

During my PhD, obtained at LENS-University of Florence (Italy) with a collaboration with University of Cambridge where I spent a research period, I made significant contributions to the field of bio-inspired photonics, by studying the light scattering mechanism laying behind the exceptional bright whiteness of ultrathin white beetle scales. By building from scratch two experimental setups, and by advanced Monte Carlo and FDTD modelling, I have demonstrated that scattering anisotropy.

Then, I moved my interest on light diffusion applied to medicine, by joining the medical optics group (T. Durduran) at ICFO (Spain), firstly as postdoc, and from 2024 as permanent staff scientist, where I specialized in diffuse optical spectroscopies and laser speckle technologies as speckle contrast spectroscopy (SCOS) and diffuse correlation spectroscopy (DCS). At ICFO, my research lines can be grouped in 3 main branches: applications to endocrinology/oncology; applications to intensive/emergency care; basic technology development & standardization. Since the translational aspect of my research, I am involved in large international collaborations with academia, high tech companies, and end-users (clinicians).

With regard to endocrinology/oncology, I led a scientific/technical team of researchers and SMEs to design, build, and test in clinics a hybrid device integrating TD-NIRS/DCS with a clinical echography system and a multimodal optical ultrasound probe. This device was tested in thyroid cancer patients (clinical campaign still ongoing).

With regard to intensive/emergency care applications, I contributed to start this research line during first wave of Covid-19 pandemic. I set up a large multi-center trial with commercial research devices (10 hospitals) to measure microvascular impairment of patients at ICU admission, and correlate to patient outcome. Then, I supervised the scientific and development team (2 junior postdocs and 1 research engineer) of a hybrid, fully automatic system advancing diffuse optical microcirculatory monitoring towards clinical practice (one patent filed, exploitation strategy ongoing). Up to now >500 patients have been measured and 10 device replicas are being deployed for different studies.

With regard to basic technology development, I explored new methods, materials and miniaturization for enabling new applications, such as wearable and interstitial monitoring. In terms of standardization of laser speckle technologies, I developed standards for device performance assessment and coordinate an informal international consortium; I developed recipes for device construction based on standardized precision targets, and studied device/operator/reproducibility differences for reducing their impact in multicenter studies with optical devices.

Currently, I am PI of two funded projects soon to be launched, for the early detection of shock in hospital and prehospital settings, and for bone fragility assessment through optics in osteoporosis. Future research lines will further explore these application new areas, will be addressed to study healthy aging, and will focus on new SCOS detection concepts and implementation in lab and clinics.

Resumen del Currículum Vitae:

I am a physicist expert in diffuse optics for health applications. Since 2024, I am Staff Scientist (permanent position, R3 to R4 range EURAXESS) at ICFO – The Institute of Photonic Sciences (Spain). I obtained a Master in Physics and Astrophysics (maximum grade cum laude) at Università di Firenze in 2012, with a thesis on disordered complex photonic materials. In 2016, I obtained an International Doctorate in Atomic and Molecular Photonics at LENS - European Laboratory for non-Linear Spectroscopy, Università di Firenze (Italy), supervised by Prof. D. Wiersma in collaboration with University of Cambridge (UK), with a thesis on light scattering optimization in ultra-thin biological photonic systems.

In 2016, I joined the Group of Medical Optics at ICFO as postdoc (PI Prof. Turgut Durduran). My work is focused on translational research in the field of medical optics, with a specialization in diffuse optical and laser speckle techniques, such as time-domain near-infrared spectroscopy, diffuse correlation spectroscopy, speckle contrast optical spectroscopy, and their application in clinical trials.

Currently, I am the principal investigator (PI) of the projects PHOTOSHOCK – Mobile photonics platform for early shock detection in the prehospital and hospital settings (AEI) and OPT-OS – Optical platform for non-invasive assessment of bone fracture risk (Generalitat de Catalunya). During my career, I have successfully managed international translational research projects (e.g., H2020 LUCA, HEMOCVID-19, H2020 VASCOVID) involving wide collaboration networks of academia, high-tech companies and end-users such as hospitals. I gave outstanding contributions to the research lines of optical technologies applied to cancer screening and endocrinology, and to start the research line of optical technologies applied to intensive care patients, by leading the development teams of novel multimodal devices, conducting multicenter clinical trials and working on technology standardization.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have a broad network across academia, industry, and clinics. I collaborate with companies on device/component development and CE certification and with clinical teams on trials, needs assessment, and adoption. Outcomes in term of exploitation include two patent applications and licensing of standard phantom preparation kits.

I have experience in mentoring and co-supervision (3 master thesis projects, 4 PhD students, and internship students), and I am a member of the thesis evaluation panel of the joint BIST@Universitat Pompeu Fabra master program. Since 2024, I am a lecturer at the Universitat Politècnica de Catalunya PhD program in Photonics (course on diffuse optical technologies for health applications), and I obtained the Italian National Scientific Qualification as associate professor of Applied Physics (equivalent to "professor titular").

I have authored 18 papers in high-impact journals, >40 conference peer-reviewed proceedings, I have an H-index of 11 with >660 citations (google scholar), filed 2 patents (under revision). I am regularly invited to preside sessions as chairman at top international conferences in biophotonics and optics, I have presented >50 contributions in >30 international congresses/workshops/seminars (13 invited and 3 selected as "hot topic" talks). I am the recipient of the SPIE Translational Research Award for 2022



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: MAKHALOV, VASILII
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Correo Electrónico: vasilii.makhalov@gmail.com
Título: Experimental Quantum Simulation with Ultracold Atoms and Trapped Ions
Resumen de la Memoria:

My research focuses on the study of complex quantum systems using ultracold quantum gases. This field of physics combines deep fundamental physics with the potential for high-impact applications. My interest spans the physics of many-body quantum systems, quantum simulations, sensing, and laser cooling of atomic gases. I have a broad expertise in ultracold quantum gases, laser cooling, laser physics, and laboratory-based optics experiments. I have contributed to internationally recognized results, including the first two-dimensional Fermi gas, precision studies of thermodynamics across the 2D BEC-BCS crossover, the creation of highly entangled spin states in dysprosium for quantum-enhanced sensing and synthetic quantum Hall systems, the first in-situ observation of supersolidity in a spin-orbit-coupled BEC, and the first strontium quantum-gas microscope. I also contributed to applied developments such as a primary vacuum pressure gauge based on ultracold lithium. These results were published in leading journals such as Science (accepted), Nature Physics, Nature Communications, PRX Quantum, Metrologia, and PRL, with several works selected as Editors' Suggestions or highlighted in Physics Viewpoint. My scientific achievements have been recognized with scholarships and awards including the Juan de la Cierva Incorporation fellowship, which I declined in favor of Beatriz de Pinós (Marie Curie co-funded postdoctoral fellowship), the seal of excellence in a Marie Skłodowska Curie action, the Institute of applied physics (IAPRAS) prize for young scientist and a prize for the best PhD students of the Russian academy of sciences.

I worked in different research academic institutes across several countries, in Russia (IAPRAS), France (Collège de France/LKB), and later Spain (ICFO). Recently, I expanded my profile through cross-sector mobility, joining a technology company, Ideaded S.L., where I contributed to the development of neutral-atom quantum-computing hardware, protocols, and meta-optical components. This industrial experience broadened my perspective on knowledge-to-technology transfer - skills that are increasingly relevant in academic quantum-technology programs.

The research line I propose builds on my background: the creation of a quantum-simulation program at IGFAE based on two complementary platforms. First, I will co-lead the commissioning and scientific deployment of IGFAE's new trapped-ion quantum simulator, one of the first dedicated scientific trapped-ion machines in Spain, which will enable simulations of spin models, real-time dynamics, and QCD-inspired systems in close collaboration with IGFAE theory groups. Second, I will develop an ultracold-atom platform targeting new quantum simulation approaches, including fermionic quantum-computing concepts, implementation of qudit control in multilevel atoms, and particular hybrid quantum computing protocols relevant to many-body physics and quantum chemistry. Together, these platforms aim to establish a long-term research program linking quantum technologies with IGFAE's expertise in high-energy physics.

My goal is to build a research group that delivers high-impact scientific results, provides training for young researchers, and contributes to the transfer of acquired knowledge toward industry and society.

Resumen del Currículum Vitae:

I am an experimental physicist specializing in studying complex quantum systems using ultracold quantum gases. My research spans the physics of quantum many-body systems, quantum simulations and sensing, laser cooling, advancing experimental techniques, and applications. I worked in 6 laboratories across 3 countries publishing 21 scientific papers in such magazines as Science (accepted), Nature Communications, Nature Physics, Physical Review Letters, and Metrologia, among others. At the moment my results were cited over 1000 times. I was awarded several grants and fellowships. I created two apparatuses for ultracold quantum gases from scratch. I reported my results at international conferences and workshops, including an invited talk. I disseminated results for the broad public in a number of outreach activities, supervised master and PhD students, and participated in peer reviewing for scientific magazines such as PRL and PRA and the QTech2020 conference.

I did my PhD studies at the IAPRAS (Nizhny Novgorod, Russia) in a group of prof. A. Turlapov. I obtained the degree from a PhD council of the ILP SB RAS (Novosibirsk, Russia) in 2015. In 2017 I moved to Collège de France in Paris. This institute hosts the most recognized scientists in France. There I joined a group of prof. J. Dalibard and Prof. S. Nascimbene as a postdoc in a laboratory of an ultracold gas of dysprosium atoms. In 2019 I joined a group of prof. Tarruell at ICFO in Barcelona as a senior postdoc. Since then, I supervised on an daily basis the construction of a new ultracold strontium quantum simulator and in 2022 I joined the potassium experiment of the same group. Until 2024 I conducted research in both groups. In 2024 I transitioned to industry as a senior engineer at Ideaded, contributing to development of neutral-atom quantum-computing hardware, software, and nanofabricated meta-optics, enriching my profile through cross-sector mobility.

In my contribution to research, I highlight the first 2D Fermi gas of atoms; measurement the ground state pressure of a 2D fermi gas on the BCS-BEC crossover. A primary vacuum utilizing ultracold gas of lithium. Study and use of highly entangled spin states of ultracold dysprosium for quantum-enhanced sensing. Bose-Einstein condensate (BEC) of dysprosium (first in France). Quantum simulation of the Lipkin-Meshkov Glick model, and study of the topology of a synthetic Hall system within the large spin of dysprosium.

The construction of an experimental apparatus takes several years and is highly valued in the community. We created a new strontium apparatus, obtained the third in the world BEC of ^{84}Sr , and discovered a method to increase the atom number in magneto-optical traps. Recently we have reported creation of the first strontium quantum gas microscope.

With the potassium team we have observed for the first time supersolid phase in spin-orbit coupled BEC in-situ. We observed crystal modes, proving that such a supersolid is not infinitely stiff as it was broadly argued before.

My scientific track reveals a number of remarkable scientific contributions, rich research experience in an international environment, a broad overview of the field of ultracold quantum gases, a network of collaborators, and a "know-how" of experimental techniques for atomic species such as lithium, potassium, rubidium, strontium, and dysprosium.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: LERENDEGUI MARCO, JORGE
Referencia: RYC2025-057000-I
Correo Electrónico: jorge.lerendegui@gmail.com
Título: Innovative Neutron Experiments for Astrophysics and the Technology Transfer of Advanced Radiation-Imaging Techniques

Resumen de la Memoria:

Throughout my career, I have developed a multidisciplinary research profile at the interface between experimental nuclear physics, nuclear astrophysics, and detector innovation, progressively consolidating my independence and leadership. My trajectory began in 2014 with a CERN Summer Student fellowship at n_TOF, which marked my first involvement in neutron physics. During my PhD (2014–2019), I focused on neutron-capture measurements of ^{242}Pu at CERN n_TOF and the BRR reactor, producing four first-author papers—one in PRC—and developing an improved cross-section analysis technique. During this period, I also contributed to high-impact measurements of ^{147}Pm , ^{204}Tl , and ^{171}Tm , taking leading roles in analysis that culminated in PRL publications. My Geant4 simulation work resulted in two of the most cited n_TOF papers of the last decade, essential for planning experimental campaigns.

Since 2019, my postdoctoral trajectory—first at CNA/Seville and then at IFIC—has allowed me to shape two major research lines that now define my scientific identity. In nuclear astrophysics, during my long postdoc stay of 2021–2022 at CERN I co-led the commissioning and optimization of the n_TOF-EAR2 facility after the upgrade of the spallation target, and led the commissioning of the i-TED detector and the first measurement of the $^{79}\text{Se}(n, \gamma)^{80}\text{Se}$ reaction, for which I serve as spokesperson. I have expanded this line to the new NEAR station, coordinating feasibility studies, developing the CYCLING concept for short-lived isotopes, and leading measurement proposals for ^{146}Nd or ^{135}Cs , the latter including an innovative synergy with ISOLDE for the production of radioactive samples. My visibility in the field is reflected in six invited plenary talks and key authorship roles in reference publications published in 2025 of both EAR2 and NEAR.

In parallel, I have built a strong technology-transfer line bridging nuclear physics with applications, mainly in the field of hadrontherapy (HT). I led the first Monte Carlo study demonstrating the potential of i-TED for proton-therapy range verification (Nature Scientific Reports) followed by experiments at HIT-Heidelberg or IBA-Reading. More recently, I also led the first feasibility studies for the application of the i-TED imaging capability to BNCT. In this line, a co-author a patent, and I have done experiments at ILL-Grenoble and LENA-Pavia. Building on the i-TED experience, I conceptualized, patented, and now lead the development of GN-Vision, a dual gamma-neutron imaging device with applications in HT, BNCT, and nuclear-waste inspection. As PI of the ViT project, secured ERC-PoC funding, published first-author publications experimental validations, established R&D contracts with AIMPLAS and ITC, and contributed to spin-off initiatives recognized by CSIC Activa-T.

The research program I propose for the RyC fellowship consolidates my career in three lines:

- Nuclear astrophysics experiments using neutron beams and radioactive isotopes: challenging neutron-capture measurements on key isotopes for the s- and i-processes
- Advanced techniques for innovative (n, γ) experiments at the international facility CERN-n_TOF: optimization of EAR2 and implementation of the NEAR CYCLING station - core element of a future ERC proposal;
- Development and technology transfer of the dual neutron-gamma GN-Vision device.

Resumen del Currículum Vitae:

My research career is centered on experimental nuclear physics with neutrons, with a strong focus on nuclear astrophysics, detector development, and applications in medical physics. Since my first involvement at CERN n_TOF in 2014, I have progressively built an independent scientific profile, combining high-impact experimental work, advanced instrumentation, and successful technology-transfer initiatives.

After completing my PhD at the University of Sevilla (2019), where I studied neutron capture on ^{242}Pu at CERN n_TOF and BRR—leading to high-impact publications in PRC and EPJ-A—I continued to expand my expertise through postdoctoral positions at CNA/Sevilla and IFIC. My early contributions to key n_TOF experiments on ^{147}Pm , ^{204}Tl , and ^{171}Tm resulted in PRL publications and laid the foundation for my later leadership roles.

During my postdoctoral career at IFIC, I worked within the ERC-CoG HYMNS project, where I helped develop and commission the i-TED detector and led the first measurement of the $^{79}\text{Se}(n, \gamma)^{80}\text{Se}$ reaction, serving as spokesperson. I conducted a one-year stay at CERN (2021–2022) to coordinate the commissioning of i-TED and support the major EAR2 upgrade, becoming second author of the reference publication describing the facility's new performance. I also contributed as a key author to the main NEAR facility paper and led feasibility studies and first pilot tests of the NEAR cyclic-activation station. In parallel, I coordinated ISOLDE campaigns to produce ^{135}Cs samples for activation measurements and initiated R&D contracts to develop neutron filters for NEAR.

In parallel, I have developed a robust technology-transfer line. I led the first Monte Carlo study demonstrating the potential of i-TED for proton-therapy range verification (Scientific Reports), contributed to BNCT imaging studies and a patent, and participated in experiments at HIT, IBA, IPNO, ILL, and CNA. Building on this experience, I conceived, patented, and now lead the development of GN-Vision, a dual gamma-neutron imaging system with applications in proton therapy, BNCT, nuclear inspections, and waste characterization. I served as PI of the ViT project, coordinated multiple R&D contracts with AIMPLAS and ITC, and published first-author results demonstrating TRL-4 neutron imaging and optimization of the final prototype. These advances supported two ERC-PoC grants and a CSN-funded project, and our work received a CSIC Activa-T award.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

These activities are reflected in my scientific indicators: more than 175 publications, including 10 as first or corresponding author (2, over 2150 citations (h-index 23, Google Scholar). Only in 2025, I have published 5 first author publications (4 + 1 accepted) and 11 as main co-author.

Moreover, I have given 6 invited presentations at major international conferences, I have co-authored 2 patents (1 as main inventor), 5 R&D contracts, 12 experiment proposals approved, and transnational access funding (EURO-LABS) for several CERN stays.

Lastly, I also have build a strong leadership and training track with the supervision 3 PhD theses (2 ongoing), 6 Master's theses, 3 Bachelor's theses, 2 research stays and accumulated 220 hours of university teaching.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: GARCÍA BERNETE, ISMAEL
Referencia: RYC2025-056560-I
Correo Electrónico: igbernete@gmail.com
Título: Novel Molecular, icy, and dusty diagnostics of AGN feedback in galaxy evolution

Resumen de la Memoria:

My research focus on galaxy formation and evolution, in particular on the role of Active Galactic Nuclei (AGN) in galaxy-black hole co-evolution, feeding and feedback, and the physical conditions of the interstellar medium (ISM).

Recent highlights of my research include leading the first JWST investigation of nuclear Polycyclic Aromatic Hydrocarbons (PAHs), demonstrating that AGN strongly alter PAH properties from tens of parsecs to kpc scales, a key result for the field. I also developed a IR-based diagnostic to identify deeply obscured AGN, representing a game-changing method for studying this elusive AGN population. I also reported the first extragalactic IR rovibrational detections of crucial small hydrocarbons (together with water and carbon oxides), published in Nature Astronomy, opening new pathways to probe organic chemistry in buried AGN and providing key insights into the chemical pathways of more complex molecules.

I have led successful observing proposals across major facilities: PI of JWST (2 PI + 1 co-PI programs), ALMA (1), NOEMA (2), GTC (5), and Yebes-40m (1). I also contribute tools and models to the community: PAHDecomp (developed under my supervision; Donnan, IGB+23,+24), which is now widely used in AGN studies.

My career is highly international, with more than five years in the UK (Oxford, Durham), and I play key roles in several major collaborations. These include GATOS (Science Board member; leading PAH and dust/molecular modeling efforts, JWST reduction, and scientific meetings coordination), the Oxford AstroPAH group (leading illumination modelling and band-frequency corrections), SpectralML (coordinating multiwavelength data reduction and mentoring), COST NanoSpace (lecturer in workshops), and teams such as Galaxy HARMONI simulations, CONquest, QUEST, and QSOFEED.

I play a leading role in major instrumentation and mission projects. I lead and coordinate the galaxies science case for LETO, an ESA M8 mission candidate that successfully passed Stage 1, and participate in extragalactic and AGN science cases for projects including PRIMA (NASA Probe-class), ALMA-2040, WST, and FIRSS.

I supervise 3 postdocs (1 current, 2 starting in 2026), 4 PhD students (2 current, 2 starting in 2026), 2 Master, and 13 undergraduate students.

I am building a new research group at CAB with funding for which I am PI, including competitive research projects (Atracción Talento 2023, AEI I+D+i 2024, ESA Faculty Research Proposal 2025, ESA Science Faculty Visitor, and La Caixa-Severo Ochoa), totaling ~736 k€ (411 k€ in project funding + 325 k€ for my salary). I also obtained two fully funded PhD positions (INTA, FPI) starting in 2026 and secured STScI support (~260 k\$; with an administrative Col in USA) associated with my 2 JWST PI programs, covering 1 postdoc and 2 PhDs at the USA.

Together with my research group, I will advance our understanding of the excitation, survival, and destruction of molecules, atomic gas, and dust in AGN, developing new diagnostics of AGN feedback and star formation activity. By integrating state-of-the-art observations, novel models, theoretical work, and laboratory constraints, this project has the potential to establish a comprehensive view of SMBH feeding and feedback processes and their impact on host galaxies, significantly contributing to our understanding of how galaxies form and evolve.

Resumen del Currículum Vitae:

I have over 12 years of research experience, including more than five years abroad (at the University of Oxford and Durham), working on galaxy formation and evolution with a focus on AGN, SMBH-galaxy co-evolution, feedback processes, and ISM physics. My research has contributed to advancing our understanding of AGN-driven feedback, the regulation of star formation, and the molecular and dust content of galaxies, particularly through state-of-the-art observations (including JWST and ALMA) and modeling.

In 2024, I joined the CAB under the Atracción de Talento Investigador Senior "César Nombela" competitive fellowship, where I am part of the ESA Faculty and currently establishing my own research group. Previously, I was a postdoctoral researcher and later a Faculty Member in the Department of Physics at the University of Oxford (2019-2024). Earlier, I was a postdoctoral researcher at IFCA (2018-2019) and Durham University (2018). I completed my PhD (Cum Laude) at the IAC/ULL (2013-2017), funded by the competitive La Caixa-Severo Ochoa fellowship, including two research stays at Oxford and Durham.

At the time of writing, I have published 85 (+5 submitted) refereed papers, 14 of them as first author, including one in Nature Astronomy (as PI), and 32 as 1st, 2nd, or 3rd author, including six papers by PhD students and postdocs under my supervision. These works have attracted 1,622 citations (h-index of 27).

I have delivered more than 10 invited talks, more than 10 invited seminars, and more than 25 oral presentations at international conferences. I am PI of major telescope proposals, including JWST programs, ALMA, NOEMA, GTC, and Yebes-40m, totaling over 260 hours of awarded time as PI.

I have been PI of research projects with significant funding (total ~736 k€ = 411 k€ in project funding + 325 k€ for my salary) and two fully funded PhD students (through FPI and INTA programs). In 2024, I was awarded the R3 certificate, which recognized the quality and relevance of my research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I play key roles in several major collaborations such as GATOS (Science Board member), LETO ESA M8 consortium (I lead and coordinate the galaxies science case), the Oxford AstroPAH group, SpectralML, COST NanoSpace (lecturer in workshops), teams such as Galaxy HARMONI simulations, CONquest, QUEST, and QSOFEED, and participate in extragalactic and AGN science cases for projects including PRIMA (NASA Probe-class), ALMA-2040, WST, and FIRSS.

I regularly review for major journals (ApJ, A&A, MNRAS), serve on the JWST Time Allocation Committee (TAC for the Galaxies panel), and act as an external reviewer for CAT-GTC and distributed peer-review panels. I have organized international workshops and conferences as the main chair of the SOC, and I have been part of local organizing committees, served as chairman, delivered review talks and concluding remarks at international conferences, and organized the Galaxy Evolution Seminars at Oxford.

I have served on PhD committees in Spain and Master evaluation committees at Oxford, and I have been a lecturer at a JWST Training School. I was a Senior Teaching Instructor and evaluator at the University of Oxford from 2019 to 2024.

I also engage in outreach through public talks, media interviews, museum events, blogs, and radio, and since 2023, I have contributed to the SEA's [Comisión Mujer y Astronomía](#).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: BERNARDO GAVITO, RAMÓN
Referencia: RYC2025-054292-I
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Título: Nonlinear resonators based on 2D materials for cavity optomechanics

Resumen de la Memoria:

Throughout my career I have been involved in different research topics, from scanning probe microscopies to optical spectroscopies, including optically detected magnetic resonance in diamond, superconducting light detectors and physical cybersecurity. This last topic was the centre of my 4-year postdoctoral stay in Lancaster University and Quantum Base Ltd., where I developed Physical Uncloneable Functions and entropy sources for true random number generators based on the nonlinear response of resonant tunnelling diodes. From that point and since I came back to Spain, I have been focused on pursuing new applications for emerging phenomena of nanostructured materials, in particular in those cases where strong nonlinearities and discontinuities appear.

During the last years I have been devoted to the study of electromechanical resonators based on two dimensional materials, as they show strong nonlinear responses in frequency that arise from the interaction of the mechanical modes of a membrane and the optical modes of the underlying cavity, and can be periodically forced through an external electrical field. Understanding and harnessing this combination of phenomena will lead to a better understanding of the physics behind these systems and to applications in communications, physical cybersecurity or sensing, to name a few. My plan is to establish a research line of applied nanoelectronics focused on emerging nonlinear phenomena on the nanoscale centered but not limited to this type of resonators.

Resumen del Currículum Vitae:

I got my PhD from Universidad Autónoma de Madrid, where my research focused on the study of two dimensional materials using scanning tunnelling microscopy and spectroscopy (STM/STS), scanning near-field optical microscopy (SNOM), and different optical spectroscopy techniques, including optical time-resolved spectroscopy.

After obtaining my PhD I moved to Lancaster University as a postdoctoral researcher in the quantum technologies field. During those three years I developed two methods to employ resonant tunnelling diodes as cybersecurity elements, first as unclonable physical functions for authentication and unique identification of devices due to the huge impact of atomic imperfections in their macroscopic properties, and then as random number generators based on the unpredictability of charge trapping processes in the tunneling structure and its surrounding defects. These developments led to the concession of five patents in collaboration with the technological start-up Quantum Base Ltd.

I joined IMDEA Nanociencia as a tenure track researcher in June 2019 with the aim of opening a new research line in the field of physical cybersecurity and for an applied nanoelectronics group. In April 2020 I obtained the Talent Attraction Fellowship from Comunidad de Madrid. I have supervised two theses (Dr. Victor Marzoa Camarero, May 2023; Cristina García Pérez, submitted October 2025). I am currently co-supervising three PhD students: Julia García Pérez (2D NEMS), Julieta Baricedo (Plasmonic biomedical sensors), Ruth Martínez Temple (2D NEMS).

My research is currently focused in the fundamental and applied research of cavity optomechanics using two-dimensional drum resonators.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: CARRASCO BLANCO, JOSÉ ANTONIO
Referencia: RYC2025-055662-I
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Título: Hardware-Efficient Quantum Computation, Characterization and Cross-Device Verification

Resumen de la Memoria:

My research trajectory is unified by the development of mathematical methods to generate, exploit, and certify complex quantum states, with a progressive shift from foundational theory toward experimentally relevant quantum-information protocols. Starting from integrable many-body systems, through quantum verification and geometric quantum control, my work consistently addresses how structured quantum states can be made operational on realistic devices.

During my PhD, I studied exactly solvable systems and the entanglement content of structured ground states, introducing generalized Lipkin-Meshkov-Glick models that connected mathematical physics with emerging quantum-information questions. With Barbara Kraus in Innsbruck, within the SFB BeyondC consortium, my focus shifted toward making such structures verifiable and experimentally accessible. I co-initiated a programme on quantum-state verification, developing entanglement-detection techniques based on partial-transpose moments and classical shadows, and acted as a theoretical interface to experimental groups led by Peter Zoller, Rainer Blatt, and Thomas Monz, including an experimental paper where I served as the leading theoretician.

In Berlin, in Jens Eisert's group, my research consolidated around near-term quantum information processing. I led original research lines on Pauli-sampling-based cross-device verification of highly entangled states, fully holonomic architectures for universal quantum computation, and symmetry-learning algorithms via the abelian State Hidden Subgroup Problem. These works have been recognised through acceptance at major international venues such as QIP, QTML, as well as through invited talks, research visits, and sustained international collaborations, reflecting the fully international character of my postdoctoral trajectory.

The proposed research programme builds directly on this foundation and significantly extends it. Its first pillar develops hardware-adapted quantum computation. Building on my holonomic framework, I will explore native multi-qudit holonomic gates and incorporate realistic open-system effects, including decoherence and incoherent noise, using geometric control and master-equation techniques. In parallel, I will initiate a new direction exploiting controlled spin-chain dynamics to realise native multi-qubit entangling gates, reinterpreting integrable models as computational resources capable of reducing circuit depth in near-term architectures.

The second pillar addresses verification and security. Extending Pauli-sampling-based cross-device verification, the programme will develop scalable protocols for certifying highly entangled quantum states without relying on efficient classical simulation. Beyond benchmarking, these methods will be explored as the basis for quantum authentication and cryptographic primitives under physically motivated computational assumptions, linking verification with quantum learning theory and post-quantum cryptography. Together, the two pillars form a coherent programme aimed at extracting practical computational and cryptographic value from pre-fault-tolerant quantum devices, advancing both the theoretical foundations and experimental relevance of near-term quantum technologies.

Resumen del Currículum Vitae:

Since completing my PhD, I have carried out six uninterrupted years of postdoctoral research in leading international centres in Austria and Germany, working with Barbara Kraus (University of Innsbruck / Munich) and Jens Eisert (Free University of Berlin), fully complying with the "attraction of talent" modality. My research has been embedded in major European programmes such as SFB BeyondC and Munich Quantum Valley (MQV-HAT), and later supported by the competitive Berlin Quantum Postdoctoral Fellowship. Throughout this period, I have shown a steadily increasing level of scientific independence and leadership, contributing to the initiation of new research lines at each institution. My work focuses on hardware-efficient quantum methods that bridge rigorous theory with experimentally accessible quantum implementations and verification, targeting challenges of near-term quantum devices.

During my PhD in Madrid (International PhD, cum laude, UCM), I worked on exactly solvable and integrable quantum systems, with emphasis on entanglement in structured ground states. I published ten peer-reviewed articles, participated in the national integrable-systems project, established international collaborations (France, Belgium, India, Iran), completed research stays in Innsbruck, Paris and Ghent, and presented at international conferences in the Czech Republic and Bulgaria, initiating a sustained international research profile.

As a postdoctoral researcher in Innsbruck within SFB BeyondC, I played a central role in developing the group's quantum verification programme. I introduced entanglement-detection and verification frameworks based on classical shadows and partial-transpose moments and contributed to hardware-efficient protocols with direct experimental relevance. I acted as a key theoretical link in collaborations with experimental groups led by P. Zoller, T. Monz and R. Blatt, including one experimental publication as leading theorist. I co-authored seven peer-reviewed papers (four as first author) and contributed to dissemination through invited talks and workshops across Austria, Germany and France.

Since 2022, in Jens Eisert's group in Berlin, I have consolidated my independence by initiating and leading three original research lines: cross-device quantum-state verification via Pauli sampling (two peer-reviewed papers as last author), the first fully holonomic architecture for universal quantum computation, and algorithmic symmetry learning via the abelian State Hidden Subgroup Problem. These works have been accepted at major



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

international conferences (QIP, QTML). I supervise a master's thesis in Berlin on the holonomic project and formally mentor a PhD student at TU Munich. I have represented Berlin Quantum and MQV-HAT in internal evaluations and maintain active collaborations with groups in Munich, Okinawa and Cape Town.

I regularly conduct research visits to Munich and Madrid and give invited seminars. I was recently invited for a research stay at the African Institute for Mathematical Science (AIMS) in Cape Town. My output comprises 21 WoS-indexed publications (>75% Q1), h-index 9 (WoS) and over 500 citations. I regularly referee for PRL, PRX and PRA, engage in open science practices, collaborate with industry on quantum-platform evaluation, and have prior teaching and outreach experience.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: QUÍLEZ LASANTA, PABLO
Referencia: RYC2025-057107-I
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Título: Multiple axions and Hilbert series

Resumen de la Memoria:

My research interests lie in the limits of our understanding of fundamental physics. I am particularly interested in building theories beyond the Standard Model which explain in a natural way some of its problems and in the phenomenological implications of such theories in current experiments. Concretely, my research mainly focuses on axion physics and new solutions to the strong CP problem, to the flavor puzzle and the nature of Dark Matter (DM). In this context, I am interested in employing novel mathematical tools to tackle these problems from a different angle, always with strong emphasis on their phenomenological consequences both in laboratory experiments and cosmology.

My PhD research focused on QCD axion and ALP phenomenology from a particle physics viewpoint. As a postdoc at DESY, I broadened this expertise into the crucial interplay between axions and cosmology and their role as a Dark Matter candidate.

Subsequently, I acquired proficiency in the advanced mathematical technique of Hilbert Series at UCSD. This powerful tool has been instrumental in enhancing the quality and scope of my research, enabling the exploration of new avenues in Effective Field Theories.

I am now leading the MSCA AxionCount Project, where I am applying this full spectrum of acquired skills spanning particle physics, cosmology, and advanced mathematical methodology to pursue these research lines as a fully independent researcher.

My upcoming research will center on the theoretical and phenomenological implications of the existence of multiple axions in nature.

Extensive theoretical efforts and strong experimental programs have been launched to investigate the possible existence of the axion. However, several well-motivated theories suggest that the axion may not exist in isolation but alongside other scalar companions. Despite this, much research focuses on the single axion paradigm. The primary goal of the project is to explore how the axion experimental program could address the questions: How many axions exist? How would the presence of multiple species alter the axion quest? The project will develop new theoretical tools to study the implications of multiple axions. On the theoretical side, I will investigate axion oscillations and explore models that predict the existence of several axions. On the phenomenological side, the project will assess how experimental constraints are modified by the presence of multiple axions. Special emphasis will be placed on how axion experiments can distinguish a multiple axion signal from that of a single axion. Finally, from a cosmological perspective, I will analyze the evolution of multiple axions in the early universe and calculate the axionic DM abundance.

This project aims to rethink the parameter space of multiple axions, expand experimental opportunities and foster synergies not only between theory and experiment, but also among different experimental efforts, as their findings may be interconnected within a multiple axion framework.

Additionally, I will pursue two complementary and ambitious avenues: developing formal connections between quantum field theory and phenomenology through tools like Hilbert Series, and studying infrared divergences in scattering amplitudes to derive robust unitarity bounds from partial wave analysis.

Resumen del Currículum Vitae:

I am theoretical particle physicist interested in different aspects of high energy phenomenology such as axions, flavor physics, dark matter and Hilbert Series. In 2019, I defended my PhD thesis at UAM supervised by Prof. B. Gavela obtaining an excellent Cum Laude and "Premio Extraordinario de Doctorado". I have held 3 postdoctoral positions: at Deutsches Elektronen Synchrotron (DESY) in Hamburg; University of California San Diego, (UCSD) in the US and currently as a TH senior fellow at CERN, secured through the Marie Skłodowska-Curie Postdoctoral Fellowship which I successfully lead.

My work has resulted into 18 papers published on scientific journals with high impact factors, 3 preprints that are under current revision (1 accepted in JHEP) and 2 conference proceedings. It has received much attention from the community, reflected by a total of 1.561 citations according to inspirehep, and an average of 69 citations for each published paper. I have presented my work in 20 invited seminars and talks in international institutions; in 24 international workshops and conferences with an oral presentation and in 5 additional workshops with a poster. Additionally, I have completed six international research visits, each lasting between one and three months (CERN Th. Department, Columbia University, Universidad de Costa Rica, Kavli IPMU, Lawrence Berkeley National Laboratory, CERN CAST Experiment). I have participated in 5 EU funded networks, currently lead my own MSCA grant, two US Department of Energy funded grant and one German project. I am a referee of 6 major international scientific journals (PRL, PRD, PLB, JHEP, EPJC, and JCAP). I have also participated as a co-author of 2 Snowmass 2021 reports (shaping the US particle physics program from 2025 to 2035). I have also officially co-supervised four master's theses (TFM) and mentored four early-career researchers.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: RIVERA SANDOVAL, LILIANA ELIZABETH
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Título: Multiwavelength studies of compact binaries

Resumen de la Memoria:

My research focuses on compact binaries (CBs), systems where a white dwarf, neutron star, or black hole interacts with a close companion. These objects are key drivers of some of the most extreme astrophysical processes: accretion physics, angular momentum loss, strong-field gravity, and gravitational-wave production. They are progenitors of major cosmic events, from Type Ia supernovae to black hole mergers. My work uses multi-wavelength observations, UV, optical, X-ray to uncover how these binaries form, evolve, transfer mass, and influence their environments, while also determining how environmental factors shape their behavior.

A central pillar of my program is the discovery and characterization of ultracompact accreting white dwarf binaries known as AM CVn systems. These helium-accreting objects are multimessenger sources and strong low-frequency gravitational-wave emitters for LISA. By leading dedicated surveys from space and ground observatories, I revealed superoutbursts lasting over a year, far longer than predicted by traditional disk instability model, and uncovered new accretion regimes driven by enhanced mass transfer. Through high-cadence observations with TESS, my team has constrained outburst durations, recurrence times, and orbital periods with unprecedented precision, reshaping theoretical models of accretion in those systems.

A second core component of my research investigates compact binaries in globular clusters, where dynamical encounters are expected to play a major role in binary formation. Using a novel UV-optical-X-ray variability and color-selection technique, I uncovered the largest population of cataclysmic variables ever identified in a globular cluster and showed that most detectable systems likely form primordially rather than dynamically. My studies also extend to globular-cluster neutron stars, including millisecond pulsars and quiescent low-mass X-ray binaries, providing insights into how dynamics shapes their evolutionary pathways.

Beyond white dwarfs and cluster populations, I have led pioneering UV studies of transitional millisecond pulsars, demonstrating that their ultraviolet emission requires an additional energy source such as intrabinary shocks, revealing new details of the accretion-pulsar state transition in neutron stars. I also made a major discovery in the field of Fast Evolving Luminous Transients, leading the first real-time X-ray and UV detection of AT2018cow, the prototype of this explosive class, sparking worldwide follow-up efforts and ongoing debate regarding its physical origin.

Looking forward, my program will continue to connect electromagnetic observations with gravitational-wave science by expanding searches for AM CVns in both field and cluster environments, conducting photometric and spectroscopic surveys with HST, JWST, ESO, and Rubin Observatory, and applying machine-learning tools to upcoming large alert streams. These approaches will deliver the statistically robust samples necessary to test binary evolution theory, improve predictions for the LISA gravitational-wave signal, and uncover the elusive progenitors of some of the most powerful events in the Universe.

Resumen del Currículum Vitae:

I am an Assistant Professor in astronomy at the University of Texas Rio Grande Valley, USA where I lead a research program centered on compact binary systems, globular clusters and occasionally studying high energy transients.

I earned my PhD in Astronomy from the University of Amsterdam and subsequently held postdoctoral positions at Texas Tech University and as an Avadh Bhatia Fellow at the University of Alberta, becoming the first Latina to receive that fellowship. I obtained my MSc in Astrophysics at UNAM where I graduated with honors and received the Alfonso Caso Medal, my BSc was in Physics at BUAP in Puebla, Mexico (I obtained the Cum Laude distinction).

I have developed extensive observing expertise using world-class facilities, including HST, TESS, Gemini, Swift, VLA, and NuSTAR. As PI, I have secured numerous competitive awards such as NASA-ADAP grants, TESS Large Programs, and several HST GO programs, enabling discoveries of unusual superoutburst behavior in ultracompact white dwarf binaries, populations of exotic binaries in globular clusters and X-ray variable emission in fast-evolving luminous transients. These programs add more than 1M USD in external research support and highlight my leadership in observational astrophysics.

I have 37 peer-reviewed publications, including 10 refereed papers as first-author (4 of which are letters), and 27 refereed papers where I am coauthor (10 as second/third author), in top-tier journals such as ApJ Letters, MNRAS Letters, ApJ, MNRAS, PASP and PASA. 6 publications have been led by members of my research group (postdoc, masters, PhD and summer students). Only one publication after the completion of my PhD is with my advisor. On top of that, I also have 19 Astronomer Telegrams (12 as first author). I have given more than 60 research talks of which 36 are invited talks at universities and international conferences, including 2 invited review talks and a keynote speaker. I have contributed to more than 30 outreach events, including more than 20 presentations and 5 interviews.

My work has been recognized through major US young faculty awards such as the Cottrell Scholar Award (2025), the first ever granted at UTRGV and second one in Astronomy in Texas. Additionally, I have been selected twice as a Women and Girls in Astronomy Program Fellow by the North American Office of Astronomy for Development, and received a prestigious Gruber Foundation Postdoctoral Fellowship from the IAU. These recognitions reflect both the scientific impact and the visibility of my research efforts.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I am committed to mentoring the next generation of scientists through supervision of postdoctoral researchers, graduate students, and undergraduate researchers (14 members in my group), many of whom have received awards for their scholarly work. I teach courses in stellar evolution and astronomy, and actively contribute to scientific service through time allocation committees, journal reviewing, the TESS Users Committee and co-chairing the Galactic group of the Once in a Rubin Gem DDT initiative to follow up LSST transients with Gemini.

I am also deeply engaged in outreach and diversity initiatives. I created "Ellas y las Estrellas", a program that highlights and supports women in astronomy, and I regularly participate in public events in both English and Spanish across USA and Latin America.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: FARRERA SOLER, PAU
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Título: Quantum optics experiments with laser-cooled atoms

Resumen de la Memoria:

My current research interests sparked during my bachelor physics studies at the University of Barcelona, where I did two research internships about quantum entanglement. Later, during my Master thesis and PhD I continued studying quantum information schemes, this time with laser-cooled atomic clouds in the group of Prof. Hugues de Riedmatten (ICFO, Barcelona). We studied the magnetic field manipulation of quantum states encoded in the cloud as spin excitation modes in the time domain, we generated and measured entanglement between these spin excitation modes and photonic time-bin qubits, and we manipulated the generation single photons in the spectro-temporal domain. In addition we used this developed manipulation techniques in order to distribute quantum states generated by our cloud to other matter platforms (an atomic cloud with Rydberg atoms and an ion-doped crystal), implementing for the first time a quantum communication link between hybrid matter platforms. Moreover, I always put a significant effort to the comparison of our experimental results with theory models and took part in a collaborations with the theory groups of Prof. Nicolas Sangouard (U. of Basel) and Prof. Darrick Chang (ICFO).

After completing my PhD I moved to the division of Prof. Gerhard Rempe at the Max Planck Institute of Quantum Optics (MPQ, Garching). There I joined an experiment that had been recently built with a single atom coupled to two optical cavities. In this experiment, in the past years we have developed several quantum information schemes enabled by the strong interaction of one atom to two independent photonic modes. Some examples are a nondestructive detector for photonic qubits, a highly efficient source of photon pairs and a source of heralded atom-photon entanglement. During this period I also received competitive independent funding from the Munich Center for Quantum Science and Technology (the MCQST Junior Researcher START fellowship with 300k€ for two years). This allowed me to pursue own ideas and obtain valuable experience in leadership, grant proposal writing and budget management. One project within this fellowship was to connect our single atom node to the telecom fiber network, something that evolved into a bigger collaboration project that we are currently working on. This collaboration project with the group Prof. Harald Weinfurter has the goal to establish a quantum communication link between two atoms separated by 14km (one located at the Ludwig-Maximilians-University LMU in Munich and the other at MPQ in Garching).

In the future I want to study the faithfully processing of multiqubit quantum information in atom-photon quantum nodes. This would be important in order to have faster quantum communication repeaters and would also open the door to remotely connect future quantum processors. The required experimental advances will also open the door for more exploratory studies in the field of quantum optomechanics. In general my research will contribute to the better understanding of quantum physics effects and potential applications.

Resumen del Currículum Vitae:

I have dedicated my career to studying the interaction between light and laser-cooled atoms at the quantum level. I have studied this interaction both in the context of fundamental quantum optics and in the direction of developing applications in quantum information science. In the context of quantum information applications, quantum light-matter interfaces are very attractive because they can interface stationary matter qubits (useful for long term storage, synchronization and processing purposes) with flying photonic qubits (useful for long distance communication). In this context laser-cooled atoms are an excellent system to implement and study such interfaces, because the low temperature of the atoms ($<100\text{ nK}$) allows to achieve long quantum state coherence times. Combining the excellent properties of both atomic and photonic qubits is very important in order to distribute quantum states over remote laboratories for fundamental quantum physics tests, build quantum communication repeaters, remotely connect quantum processors, or perform distributed quantum sensing schemes. On the applied side, these systems can or may be used in the future to send messages with enhanced security (ensured by the laws of physics), perform computing algorithms that outperform current classical analogues, or perform measurements with quantum-enhanced precision. Overall I find quantum light-matter interfaces based on laser-cooled atoms an excellent quantum science playground. It has excellent prospects to both study a wide variety of quantum optics effects and develop applications related to quantum technologies.

During my PhD at the Institute of Photonic Sciences (ICFO, Barcelona) I have worked with a quantum light-matter interface based on a laser-cooled cloud of Rubidium atoms. During my time as postdoctoral researcher at the Max Planck Institute of Quantum Optics (MPQ, Garching) I have worked with a light-matter interface consisting of a single Rubidium atom coupled to two crossed optical cavities. In this context, some of my main scientific achievements can be grouped in the following scientific directions:

- Photonic quantum state distribution between hybrid matter systems
- Atom-photon entanglement in the time-bin degree of freedom
- Nondestructive detection of photonic qubits
- Heralded generation of atom-photon entanglement
- Metropolitan long distance distribution of atom-photon entanglement

Overall my research lines have led to 14 scientific articles in a wide range of journals, 3 manuscripts that are currently under preparation, and excellent prospects for exciting follow-up experiments that are currently being studied.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

In addition to all my scientific research activities, I also participated in several science outreach activities both at ICFO and MPQ (mostly giving talks to students and through divulgative videos on YouTube), I was postdoc representative within the Munich Center for Quantum Science and Technology, and have been reviewer for numerous journals. Last but not least, I received the ICFO PhD Thesis award and I'm very proud that 3 students I co-supervised received awards for their theses (2 master students and 1 PhD student).



MINISTERIO
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: BELDA PALAZÓN, SANTIAGO
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Título: Advancing Earth Rotation Modelling and Geodetic Reference Frames through Multi-Technique Space Geodesy and AI-Based Prediction

Resumen de la Memoria:

Understanding and predicting the Earth's rotation is a central challenge in astronomy, astrometry and space geodesy. Accurate Earth Orientation Parameters (EOP) underpin precise timing, spacecraft navigation, GNSS positioning and the long-term stability of the ITRF/ICRF (terrestrial/celestial) reference frames. Their variations reflect the complex interaction of geophysical processes-atmospheric and oceanic circulation, postglacial rebound, mass redistribution, luni-solar tides, linking fundamental astronomy with the dynamics of the Earth system. My research addresses this challenge through advanced analysis of geodetic VLBI, the only technique capable of determining the full set of EOP while defining the celestial reference frame.

I have developed new methodologies that improved daily EOP prediction accuracy by up to 40%, with direct impact on astrometry, satellite orbit determination and real-time navigation. My contributions include refined precession-nutation and FCN models, consistency analyses of ICRF/ITRF/EOP, and the implementation of these advances in international software (PORT). These developments led to my invitation to the IERS Second EOP Prediction Comparison Campaign and have strengthened global geodetic operations. I am co-founder and technical coordinator of the UA VLBI Analysis Center (UAVAC), the first Spanish IVS-accredited centre, which has secured two major IGN technical-assistance contracts (~500k) for VLBI data processing and EOP estimation as PI.

In parallel, I have established an independent line of research on satellite remote sensing. I developed retrieval algorithms for biophysical variables from hyperspectral and multispectral observations, integrating machine learning, radiative-transfer modelling and multisensor data fusion. I created DATimeS, an open-access toolbox for satellite and geophysical time-series analysis, now used internationally and partially protected under IP rights. My work contributed to ESA missions FLEX and CHIME, and to H2020 projects SENSECO, SENSAGRI and SENTIFLEX (ERC-STG).

My trajectory shows sustained leadership and international engagement: participation in 3 H2020 projects, 4 ESA contracts, and a COST Action; active membership in IAU (Int. Astronomical Union), IAG (Int. Association of GEODESY) and IVS (Int. VLBI service) working groups; invited talks; session-chair roles; and continuous collaboration with leading institutes (GFZ-German Research Centre for Geosciences, TU Vienna, ETH Zürich, BKG-Federal Agency for Cartography and Geodesy, SYRTE). I obtained competitive fellowships (FPI, APOSTD, María Zambrano) and a 4-year GenT project that enabled me to establish an independent research group at the University of Alicante.

The proposed research will develop next-generation EOP models and predictions, refine precession-nutation and FCN representations, and introduce rigorous VLBI+GNSS combination strategies. Hybrid physical-AI approaches will exploit geophysical linkages to deliver improved short- and medium-term EOP forecasts. A long-term objective is the creation of an official Rapid Service/Prediction Centre and the release of open-access EOP-prediction software, reinforcing Spain's contribution to global reference-frame infrastructure. These advances will help meet the 1-mm GGOS accuracy target and support the scientific and operational needs of modern astronomy and space

Resumen del Currículum Vitae:

I graduated in Geodesy and Cartography from the Polytechnic University of Valencia (UPV, 2009) and hold an MSc in Remote Sensing from the University of Valencia (UV, 2011). I obtained a national FPI fellowship to complete my PhD at the University of Alicante (UA), finishing in 2015 with the Extraordinary Doctorate Award. My international postdoctoral career includes an APOSTD Fellowship at the German Research Centre for Geosciences (GFZ, 2016-2018) and a position within an ERC project at the Laboratory of Earth Observation (LEO, UV). In 2021, I received a highly competitive 4-year GenT research grant (Generalitat Valenciana), enabling me to establish my independent laboratory on geodesy and space-based Earth observation. In 2022, I was awarded a María Zambrano Postdoctoral Fellowship and attained a positive I3 evaluation.

My main research line is astrometric and geodetic VLBI and its contribution to astronomy and space geodesy. I focus on improving the modelling of Earth rotation-precession, nutation, Free Core Nutation (FCN) and on the realization of terrestrial and celestial reference frames (ITRF/ICRF), which are fundamental pillars for astrophysical studies, spacecraft navigation and deep-space missions. I co-founded and serve as Primary Technical Contact of the UA VLBI Analysis Center (UAVAC), the first and only official IVS Analysis Center in Spain and one of only 20 worldwide. This strategic contribution positioned Spain within the international VLBI infrastructure and led to two Technical Assistance Contracts (LOSU Art. 60) with the National Geographic Institute of Spain (IGN), totaling 500,000, where I act as Principal Investigator (PI). My work aims at developing next-generation VLBI products and integrated VLBI-GNSS solutions with direct impact on the stability of the celestial reference frame, Earth orientation parameters (EOP) prediction, and the consistency between space geodetic techniques.

A second research pillar concerns remote sensing (RS), where I develop retrieval methodologies for biophysical variable estimation from hyperspectral and multispectral data using machine learning (ML), radiative transfer models and vegetation indices. I am the initiator and coordinator of DATimeS, a scientific software package for the analysis of satellite time series. This complements my primary VLBI-astronomy line by contributing to Earth system observation.

My international training includes five research stays (2 years) in leading institutions such as TU Vienna (Advanced Geodesy Group) and GFZ (Geodesy & RS), under mentorship of internationally renowned figures including Dr. Harald Schuh (Honorary President of IAG and member of the UN



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Subcommittee on Geodesy). This expertise has enabled me to serve as vice-chair of Joint Study Group 3 (GGOS/IAG) and to contribute to working groups of the IAU, IVS and IAG related to reference frames and Earth rotation.

I have taken part in numerous European (H2020,ERC,COST), national and regional projects, and in several ESA contracts. I co-organized three international conferences and one summer school. Since 2015, I have published 40 JCR papers (30 Q1; 1,300 citations), 12 book chapters, 10 educational papers and over 100 conference contributions. I have supervised one PhD and two MSc theses and currently advise another PhD student. I also teach across several degrees (400 hours)



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: MARTIN , GARRETH WILLIAM
Referencia: RYC2025-056006-I
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Título: Illuminating the Dark: Using Faint Starlight to Probe Dark Matter and Cosmic Structure Formation

Resumen de la Memoria:

Dark matter dominates the Universe but cannot be observed directly; we infer its presence from the gravitational effects it imposes on the motions and shapes of stars and galaxies. The standard LCDM framework reproduces large-scale structure convincingly, yet on galaxy scales it predicts central dark matter concentrations that exceed those inferred from observations. These small-scale discrepancies could signal either missing physical ingredients in the model or incomplete understanding of baryonic processes.

The next decade of discovery will be driven by Euclid and LSST, which will extend observational reach into the low-surface-brightness regime. I specialise in developing scalable methodologies that permit these surveys to move beyond bright, high-mass systems and into the faint Universe where dwarf galaxies, stellar haloes, tidal debris and intracluster light provide sensitive tests of both galaxy formation physics and the dark matter distribution.

My work has focused on methodologies that enable direct, bias-controlled comparison between simulations and observations: realistic forward-modelling, survey-matched synthetic imaging, machine-learning classification without pre-defined morphological labels, and explicit accounting for both observational selection effects and numerical systematics. This has included producing the first robust mock LSST tidal-feature library, identifying systematic offsets between intracluster light and dark matter, and quantifying the structural diversity of low-mass galaxies across simulations and ultra-deep imaging. These efforts aim to assess whether the apparent small-scale tensions with LCDM are intrinsic to the model or arise from modelling assumptions and detection limits.

My career path reflects a consistent focus and leadership in this faint regime. During my PhD at Hertfordshire I established the environmental pathways that produce low-surface-brightness galaxies. As a KASI@Arizona Fellow I expanded this work to synthetic observations for Rubin, quantifying detectability limits and supporting survey strategy. Since moving to Nottingham I have led a programme connecting diffuse light to its underlying dark matter, producing predictions and Euclid-compliant mock data to inform survey pipelines, while also supervising students working on intracluster light, stellar stripping and black holes. Through these activities I have developed clear research independence, including responsibility for project design and supervision of students, coordination across international collaborations spanning Euclid, LSST precursor imaging and numerical simulation efforts and leadership roles within these consortia.

By combining physically motivated simulations with observational realism I aim to deliver the most stringent tests to date of galaxy formation models in the low-mass, low-surface-brightness regime. Confirming or ruling out current small-scale tensions would represent a substantive advance in our understanding of both dark matter and its role in shaping the assembly of galaxies.

Resumen del Currículum Vitae:

Since completing my PhD, I have held independent fellowships in the United States and Korea and currently hold a Senior Fellowship at the University of Nottingham. Over this period, I have published over 60 peer reviewed papers, accruing more than 2,100 citations. My first author work on galaxy evolution, low-surface-brightness science, and machine learning has attracted, on average, over 65 citations per paper; I received 750 citations in 2025 alone and am on track to double that total in 2025, demonstrating growing impact.

My methodological contributions have been extensively applied within multiple collaborations and, together with new external collaborators, have been applied in over eight subsequent publications, enabling robust machine-learning training (e.g., Margalef-Bentabol et al. 2024), consistent observation-simulation comparisons (e.g., Brough et al. 2023), and the development of LSB-compliant pipelines for Euclid and LSST. I have released five publicly available tools, demonstrating a commitment to open research and community leadership.

Recognition of my contributions includes a Balzan Visiting Fellowship, the KASI Outstanding Postdoctoral Researcher Award (top 1%), and invited talks at fourteen conferences and colloquia.

I have contributed to deep imaging surveys such as SMUDGES and LIGHTS, generating precursor datasets essential for LSST and Euclid. I am a member of the Euclid Collaboration, and within the LSST Galaxies Science Collaboration I co-chair the Morphology Working Group and have led a 50 member project characterising observational biases in detecting LSB light. These leadership roles provide both expertise and privileged access to LSST and Euclid datasets, allowing me to coordinate survey and simulation efforts effectively to deliver robust, simulation-informed analyses of low-surface-brightness galaxies and diffuse stellar structures. I have also led work packages in major cosmological simulation collaborations such as Horizon-AGN and The300, and played a key role in securing 40 million CPU hours for the NewHorizon project-one of the few cosmological simulations with sufficient resolution to study galaxy structure and diffuse light. I have co-supervised four PhD students, one of whom is now a postdoctoral researcher, with my mentoring resulting in ten student-led publications.

This experience has prepared me to lead a research programme that harnesses ultra-faint diffuse light as a precision tracer of dark matter and cosmic structure formation. By pioneering low-surface-brightness science, I will deliver definitive tests of whether LCDM can accommodate these new observations or if they point to novel physics. A long-term fellowship like the Ramón y Cajal will provide the stability and resources needed to remain at the cutting edge of this emerging field and to adapt as the Euclid and LSST datasets evolve over the coming decade, alongside complementary next-generation instruments.



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Turno General

My goal is to secure a permanent academic position where I can establish an inclusive, collaborative research group at the interface of simulations and data science, integrating cross-disciplinary training in AI and big-data techniques, while contributing to high-impact academic research across and beyond astronomy.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: CALDERÓN INFANTE, JOSÉ
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Título: Bootstrapping the Quantum Gravity Swampland

Resumen de la Memoria:

Understanding gravity at the quantum level remains one of the most significant and challenging goals in modern theoretical physics. Given the absence of experimental input, the most promising approach is to identify first principles and universal properties of any theory of Quantum Gravity (QG). Of particular relevance is the study of imprints on low-energy physics. This is the goal of the Swampland program, which has led to a number of conjectural criteria that any Effective Field Theory (EFT) must satisfy in order to arise from a theory of QG.

Given the lack of a framework for QG, it is crucial to combine different approaches to QG when studying these criteria. My research tackles them using String Theory and AdS/CFT, as well as from a bottom-up perspective using black hole physics and the holographic principle. In this context, the focus of my research has been driven by three main goals:

1. Study these criteria in the context of AdS/CFT holography and rigorously establish them using conformal bootstrap methods.
2. Provide bottom-up rationales for them based on first principles of QG such as the holographic principle that follows from black hole physics.
3. Refine the formulation of these conjectures, test their consistency, and develop tools to test them in increasingly complex settings.

Among other research directions, I have studied the realization of the Distance Conjecture in AdS/CFT—a remarkable framework in which a theory of QG in AdS (the bulk) is encoded in a conformal field theory (CFT) at the boundary. In JHEP 2021, 57 (2021), my collaborator and I showed that this conjecture is naturally realized in a large class of CFTs at weak-coupling limits. Shortly after, the authors of JHEP 10 (2021) 070 independently arrived to the similar results and formalized these observations by proposing the CFT Distance Conjecture. In the follow-up publication JHEP 12 (2023) 163, my collaborator and I proved the first part of this conjecture. The proof applies to any local and unitary CFT in more than two dimensions. In particular, the stress tensor in the CFT (which is always present if it is local) plays a crucial role in the proof. This is particularly satisfying, since the stress tensor in the CFT is dual to the graviton in AdS. That is, our proof explicitly relies on having dynamical gravity in the bulk. A crucial feature of our proof is that it does not assume any supersymmetry, which has always been a difficult assumption to drop in Swampland studies.

My future research program lies in the interface between Swampland, bootstrap, and holography, hence fostering interactions among these communities. The goal is to address the Swampland criteria using innovative approaches such as the conformal bootstrap and the S-matrix bootstrap. Through AdS/CFT holography, the conformal bootstrap and the Swampland program in AdS give rise to a fruitful synergy: the conformal bootstrap offers tools to rigorously address the targets provided by the Swampland program. A similar interaction arises between the Swampland program in flat space and the S-matrix bootstrap, whose goal is to establish bounds on scattering amplitudes from first principles such as unitarity, causality, and locality. I am convinced that these multidisciplinary approaches can significantly deepen our understanding of quantum gravity.

Resumen del Currículum Vitae:

My research focuses on identifying universal criteria that any consistent theory of quantum gravity must satisfy, with emphasis on their consequences for low-energy effective field theories (Swampland program). My main focus has been on the so-called asymptotic regimes, where these universal properties show up more clearly. A most prominent example is that of the Distance Conjecture, to which I have dedicated a significant amount of my research. During my career, I have studied these regimes using complementary top-down approaches such as string theory and AdS/CFT holography, as well as from a bottom-up perspective using black hole physics and the holographic principle. One of my main goals has been to rigorously establish these universal properties in the context of AdS/CFT by using conformal bootstrap methods. Recently, I have also started exploring these criteria in flat space using S-matrix bootstrap methods.

I have published 15 papers in high-impact peer-reviewed journals with a total of 1,228 citations and h-index 14 (source: INSPIRE-HEP). I have presented my research in more than 20 international conferences, as well as invited seminars in more than 10 top-tier institutions. I have also refereed papers for JHEP, JCAP, Physics Letters B, SciPost Physics and MDPI Astronomy. My teaching experience includes being teaching assistant for five different undergraduate courses and giving lectures on two international PhD schools. I have contributed to various outreach efforts by recording videos for the IFT Youtube channel, giving talks at high schools, and being a moderator for the CERN International Masterclasses 2025. I am also actively engaged in community service, including organizing the CERN TH string theory seminar, co-organizing a parallel session at SUSY 2024, and being part of the String Mentoring Program team while also serving as a mentor for young researchers from underrepresented groups.

After completing my BSc and MSc at the University of Granada and University Autónoma de Madrid, respectively, I was awarded a FPU fellowship. I completed my PhD under the supervision of Prof. Ángel M. Uranga at the Instituto de Física Teórica UAM-CSIC. I showed independence from this early stage, publishing the third paper during my PhD in collaboration with a postdoc. This work initiated a fruitful line of research about the Distance Conjecture in AdS/CFT.

For my first postdoc, I obtained a highly competitive Senior Research Fellowship at CERN Theory Department. This position gave me the freedom to pursue my own research interests. During this period, I was the driving force of various international collaborations involving different perspectives and techniques. This includes a follow-up to the paper above in which we proved the first part of the CFT Distance Conjecture. This is the first clean and rigorous proof of a Swampland criterion in AdS/CFT using Conformal Field Theory (CFT) techniques.



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Turno General

I recently started my second postdoc, for which I was awarded a very prestigious Burke Institute Prize Fellowship at Caltech. This distinguished position is allowing me to rapidly expand my network of collaborators in the US, while maintaining strong links with Europe.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
Nombre: POLO GOMEZ, JUAN
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Título: Cold Atom Quantum Technology

Resumen de la Memoria:

I work at the interface between fundamental physics and quantum technologies, using ultracold atoms as a controllable platform for quantum simulation and sensing. My background spans quantum tunneling, atomtronics, SU(N) physics and Rydberg-based sensing. I currently lead the cold-gases theory section at the Quantum Research Center at TII (UAE), coordinating both senior and junior researchers.

The proposed research develops analog quantum simulation with ultracold atoms as a test bed for complex quantum circuits and quantum sensors. Ultracold gases provide long coherence times, tunable interactions and direct access to density, phase and current observables, making them ideal to emulate phenomena that are difficult to probe directly in superconducting devices. The program is organized in three connected pillars.

Pillar I Circuit analogues with ultracold atoms: I will engineer ring, ladder, junction and SQUID-like geometries where atomtronic currents and phases map onto standard circuit variables. By studying Y-junctions, ladders and multi-terminal devices, I will determine current-phase relations within and beyond mean field, identify regimes where junctions behave as Josephson elements and where strong correlations or dissipation dominate. I will use time-dependent Gross-Pitaevskii simulations with Luttinger-liquid approaches, Tonks-Girardeau mappings and exact diagonalization, producing circuit-ready models directly comparable with superconducting devices.

Pillar II From SU(N) physics to functional circuits: I will extend the above ideas to multi-component and SU(N) systems, motivated by recent alkaline-earth-like atom experiments. Lattices and ladders populated by SU(N) fermions or bosons, possibly with synthetic gauge fields, will be treated as circuit elements with tunable flavor structure. I will analyze how spin, charge and flavor degrees of freedom shape transport and current patterns, how controlled symmetry breaking allows routing or filtering of currents, and how chiral currents or symmetry-protected channels can be characterized with cold-atom observables. I will use exact diagonalization, DMRG, bosonization and reduced models to connect microscopic parameters to simple circuit descriptions.

Pillar III Sensing with analog models: The atomtronic and multi-component circuits above will be used to design quantum sensors with clear figures of merit. For cold-atom platforms, I will explore rotation and acceleration sensing, quantifying sensitivities, bandwidths and dynamical ranges and benchmarking against interferometric sensors while including realistic noise and technical constraints. In parallel, I will refine and extend my work on Rydberg-atom field sensors in circuit-inspired architectures, producing realistic sensitivity projections.

Overall, the project will build a reusable theoretical toolbox and a framework linking cold-atom observables to quantities used in superconducting theories. It will advance our understanding of coherence, transport and dissipation in low-dimensional quantum circuits, while delivering realistic device and sensor proposals.

Resumen del Currículum Vitae:

I am a theoretical physicist working at the interface of fundamental physics and quantum technologies, with a focus on coherent dynamics of ultracold atoms, quantum dissipation and decoherence, and atomtronics. My research expertise includes developing schemes for soliton-based matter-wave interferometers, engineering complex tunneling amplitudes for quantum simulation, studying the mechanisms for effective thermalization via low-energy excitations, and performing machine-learning analyses of cold-atom systems. I currently serve as Lead Researcher at the Technology Innovation Institute (TII, in UAE), where I lead the ultracold-atom theory section (consisting of three senior researchers, one postdoc, four PhD students), aligning our cold-atom activities with institutional and national quantum-technology roadmaps, and also help manage our internal HPC cluster

I have held research positions in Spain (where I obtained my BSc, MSc and PhD in Physics), France (as postdoctoral researcher at CNRS), Japan (as postdoctoral researcher at OIST) and the UAE (currently as lead researcher at TII). I have also made both short and extended research visits to research centers in France, UK, Singapore and Spain, funded through competitive grants or by the host institutions. My work experience has enabled me to build strong links between theory and experimental groups and to establish long-term international collaborations across Europe, Japan and the Middle East.

I have authored 36 Q1 publications (including several Physical Review Letters and a Physics Reports review), with a Google Scholar h-index of 19 and 1047 citations, delivered 22 talks and 14 posters, and secured funded grants/awards, including a 2 year JSPS Kakenhi project from Japan as PI.

I gained teaching experience in the role of teaching assistant for three years, delivering Electromagnetism seminars at UAB (Spain), and as an instructor for technical courses (terminal, gnuplot, LaTeX, Julia) at OIST (Japan). Later I mentored and co-supervising PhD students in Japan and the UAE, including one who later became a Marie Curie fellow. I regularly evaluate scientific publications as referee for leading journals (Physical Review A/B/Letters, Europhysics Journal, Quantum Science and Technology), served as Marie Curie evaluator, and as PhD committee member at UPV (Spain).

I am active in community building and outreach activities as co-organizer of the Atomtronics conferences in Benasque (2022, 2024, 2026), local organizer of the TII Quantum Technology Symposium within the UAE Year of Quantum 2025, and exhibitor at GITEX (2021-2024).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias físicas
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Título: Neuromorphic Integrated Nonlinear platforms for Artificial intelligence-based photonic processing (NINA)

Resumen de la Memoria:

My research line aims at developing energy-efficient, on-chip neuromorphic photonic platforms for artificial intelligence. Current artificial neural networks rely on electronic hardware in large data centers. Training and inference in deep models require extensive computational power, driving data center growth and raising concerns about energy use and environmental impact.

Neuromorphic photonics offers an alternative approach in which information processing relies on light rather than electrical signals. Optical carriers provide high bandwidth and speed and support dense parallelization, enabling high throughput with reduced energy per operation.

Fiber-based optical neural networks have demonstrated feedforward, convolutional, and recurrent topologies, but they rely on long optical paths that limit speed and increase latency, making real-time processing almost impractical. Integrated platforms such as silicon nitride and silicon-on-insulator support on-chip components, for instance, Mach-Zehnder interferometers and microresonators, that perform matrix multiplication, weighting, and nonlinear activation (i.e., the fundamental operations in a neural network). Recent demonstrations show strong potential for on-chip optical neural networks. However, current systems remain limited in network size, reconfigurability, and task diversity, and still lack efficient real-time on-chip training.

To tackle these challenges, this research line is organized into three objectives. Objective 1 focuses on the design of neuromorphic photonic chips. Each chip will include three units. The first receives and formats incoming optical signals. The second, the neural core with integrated optical artificial neural networks, performs the computations and is trained with machine learning methods. The third stores network settings (e.g., the node weights) used during training and inference. I will study complex modulation techniques to feed multiple data streams into the chip in parallel and to encode multiple bits per light symbol, in order to increase speed. Numerical simulations will define suitable materials, sizes, and layouts, and will verify that the designs are realistic for fabrication.

Objective 2 refines and optimizes designs for prototyping. I will use metaheuristic algorithms to include manufacturing constraints and tune key operating parameters. Simulated tests on machine learning tasks, such as prediction and classification, will assess versatility and performance using metrics such as accuracy, data rate, latency, and energy per operation. Only designs that reach the required targets will proceed to prototyping at external foundries and will be tested for reliability in controlled laboratory conditions.

Objective 3 targets packaging and commercialization strategies. I will define packaging options for reliable prototypes, assess system-level performance, and perform reliability tests, while managing intellectual property and exploring licensing and spin-off opportunities beyond the grant duration.

The Ramón y Cajal grant will support my research line in Spain at the intersection of integrated photonics, neuromorphic photonics, and artificial intelligence. It will offer training opportunities for students, foster collaborations with leading groups, and promote knowledge transfer and dissemination, while supporting European goals for green transition.

Resumen del Currículum Vitae:

Dr. Luigi Di Lauro is a physicist whose research bridges nonlinear photonics and artificial intelligence to develop neuromorphic devices for optical signal processing. He has authored 12 peer-reviewed journal articles, including three in the Nature portfolio and an invited review in *Advances in Optics and Photonics*. He has presented 58 contributions at international conferences, including four invited talks, and written one book chapter. He is a co-inventor on three patents related to optical information processing and mode-locked lasers. According to Google Scholar, his work has received more than 1,200 citations, and his h-index is 10.

Dr. Di Lauro earned his PhD at the University of Sussex, where his research on nonlinear dynamical regimes in optical microresonators for frequency comb applications led to his first publication and to the first paper of his former team at Sussex (L. Di Lauro et al., *Opt. Lett.* 42, 3407–3410). The study identified operating conditions for stable, robust combs, which later enabled demonstrations of background-free temporal cavity solitons in nested optical cavities, suitable for optical atomic clocks and precision metrology (H. Bao et al., *Nat. Photon.* 13, 384–389, 2019). Since 2019, as a postdoctoral researcher at the Institut national de la recherche scientifique (INRS), Dr. Di Lauro has worked at the intersection of nonlinear photonics and artificial intelligence. His investigation included smart autonomous optimization methods for the generation and customization of microcombs (C. Mazouk et al., *Commun. Phys.* 7, 81, 2024) and photonic processing devices based on optical neural networks for telecom signal recovery. The latter achievement is the first neuromorphic demonstration from his current research team and was recently accepted for publication in *Nature Communications*.

Dr. Di Lauro's career has been supported by competitive funding calls during which he has served as principal investigator, leading objectives and coordinating research activities. He has helped secure over 5 million CAD for his group at INRS through participation in major collaborative R&D projects with academic partners in Europe, North America, and Asia. Dr. Di Lauro has established new collaborations and strengthened existing ones, funded by public agencies and industry partners such as Huawei and Ki3 Photonics.

Dr. Di Lauro has supervised over 14 students at the BSc, MSc, and PhD levels in physics. In this role, he mentors trainees to achieve planned project milestones and supports their career growth by involving them in collaborative projects, co-authoring journal papers, and encouraging conference participation. His guidance has enabled his mentees to earn scholarships and secure jobs. Through project leadership and successful funding acquisition, he has developed strong skills in building and managing research teams, preparing him for broader academic responsibilities.

Dr. Di Lauro participates in peer review for leading journals, including *Nature*, *PRL*, and *IEEE*, and serves as a guest editor for an upcoming special issue on neuromorphic photonics in *MDPI Photonics*. He has chaired technical sessions at major conferences, including CLEO US. He served as an invited expert in drafting the first General Purpose AI Code of Practice (European Commission), which provides guidelines on safety and copyright for AI models.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
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Título: Classifying, Geometrising and Taming Coherent Groups
Resumen de la Memoria:

The main focus of my research in recent years has been on the investigation of coherent groups. These are groups that have the property that all their finitely generated subgroups are finitely presented and therefore represent the largest class of groups in which there is any hope to understand their subgroup structure. One can compare this with the theory of rings and algebraic geometry where coherent rings and sheaves play an analogously important role. Despite this, the theory of coherent groups is highly underdeveloped and tools have not yet been established to determine whether important groups such as $SL(2, \mathbb{Z}[1/p])$ or $SL(3, \mathbb{Z})$ are coherent or not. A conjecture due to Serre from 1974.

Recently, work due to Jaikin-Zapirain, Louder, Wilton, Wise and myself has uncovered exciting new connections between coherence, L^2 -invariants and notions of non-positive topological curvature. An investigation into such groups therefore presents an important direction of research which is only now starting to gain traction. The three broad objectives of my research programme are thus to:

- 1) Classify: Characterise coherence in terms of algebraic or topological invariants.
- 2) Geometrise: Determine algebraic obstructions to hyperbolicity (or other notions of non-positive curvature) amongst coherent groups.
- 3) Tame: Establish subgroup tameness results for coherent hyperbolic groups.

In recent work with Jaikin-Zapirain, we proved that, under mild conditions, both the vanishing of the second L^2 -Betti number and the non-positive immersions property imply coherence. As a consequence of this criterion, we showed that all one-relator groups are coherent, solving a well-known conjecture of Baumslag's from 1974. One of the main aims of theme 1) would be to provide a converse to this criterion and therefore completely understand coherence in terms of these invariants. The main application of this would be the resolution of Serre's conjecture.

Another problem I have worked extensively on is on the algebraic characterisation of hyperbolic groups. For instance, in my PhD I showed that 2-free one-relator groups are hyperbolic (and cubulated). A conjecture of Gromov's predicts that the only obstruction to hyperbolicity is the presence of certain poison subgroups. Although false in general, Gromov's conjecture has been verified for many coherent groups of interest to topologists and group theorists. In fact, coherent groups form the largest natural class of groups in which Gromov's conjecture could hold true. My work on theme 2) aims to obtain a better understanding of obstructions to hyperbolicity and a solution to a well-known conjecture of Gersten's from the 90s.

The tameness of hyperbolic 3-manifolds, due to Agol and Calegari--Gabai, can be thought of as a geometric version of coherence which had several deep consequences for Kleinian groups and their subgroups. The subgroup tameness conjecture proposes that such consequences should also hold for certain mapping tori of free groups. In some of my recent work, I have showed this to be true with an extra hypothesis. An initial aim for theme 3) will be to remove this extra hypothesis. The main aim will then be to understand to what extent tameness and other 3-manifold inspired structural properties hold amongst coherent hyperbolic groups.

Resumen del Currículum Vitae:

My area of research is known as geometric group theory. I use ideas and techniques from geometry, low-dimensional topology and homological algebra to study infinite groups. In total, I have written 15 articles which are currently publicly available on the arXiv, 7 of which are published. Some journals I have published at include the Annals of Mathematics, Duke Mathematical Journal and Geometric and Functional Analysis.

In terms of dissemination, I have, upon invitation, given talks at 37 seminars and 17 international conferences. I have also given 3 mini-courses on my work. At the time of writing, I have been invited to give 4 more invited talks and 2 more mini-courses at international conferences and workshops in 2026-2027. I was also invited to KIAS to give the KIAS-Springer Lectures on my recent work on one-relator groups in 2024, along with which I was asked to prepare a survey article which will be published in Recent Progress in Mathematics, a book in the KIAS-Springer Series in Mathematics. I was also selected to give the inaugural Sapir Distinguished Lecture at the GAGTA conference 2026, official satellite conference to the ICM.

I have had some experience with teaching, supervision and outreach. In 2025 I taught the final year Advanced Algebra Course on geometric group theory at the Universidad Autonoma de Madrid. At the same time, I supervised a successful masters project (TFM). After writing my student (Alba Gonzalez Gonzalez) a reference letter for her PhD applications, she is currently pursuing a PhD at the University of Oxford. I supervised a summer research student in 2025 for the JAE school at which I also gave an outreach talk. As part of the Mathematics Intensive Programme (MIP) at the ICMAT I have met with students to give them an idea of research mathematics. While I was at Oxford, I was involved with the assessment of masters applications and I was a secondary examiner for the DPhil confirmation of Sam Fisher. I also received funding to support a summer research student, who, due to unforeseen circumstances, could not undertake the project. While I was a PhD student at the University of Warwick, I gave talks as part of open days, taught many support classes and marked assignments.

Throughout my academic career I have also organised several reading groups and was an organiser for the latest Groups in Madrid conference. While I was at Warwick, I was an organiser of the Dynamics and Group Geometry Early Researchers seminar. I have also been asked to referee for several journals and have been asked for quick opinions from the Journal of the European Mathematical Society, Geometry and Topology and for the Journal of the London Mathematical Society. I am also a reviewer for Mathscinet.



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Turno General

Área Temática: Ciencias matemáticas
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Título: Harmonic analysis beyond weighted Lebesgue spaces

Resumen de la Memoria:

In the study of partial differential equations (PDEs), singular integrals of the initial data are studied to derive properties of the solution. In classical harmonic analysis, these integrals were studied for initial data belonging to weighted Lebesgue spaces, which describe a certain integrability condition, with respect to so-called Muckenhoupt weights. The goal of this project is to broadly study singular integrals beyond the classical setting.

The main settings we will consider are:

-Function spaces: many PDEs have initial data belonging to a variety of spaces not included in the class of weighted Lebesgue spaces. For example, boundary data for elliptic PDEs typically belong to Morrey spaces, which model fractional regularity. Variable Lebesgue spaces appear in PDEs that model problems with non-homogeneous data such as, e.g., non-Newtonian fluids and image processing. In these settings, a simple characterization such as the Muckenhoupt condition does not exist. To systematically study this wider setting, we will use the framework of Banach function spaces, whose defining axioms have a particularly nice synergy with the classical tools of harmonic analysis.

-Limited range and multilinear: many singular integrals cannot be applied to data in the full range of integrability exponents. This typically occurs in PDEs associated to some form of non-smoothness, such as on rough domains or those given by an elliptic operator with rough coefficients. Important singular integrals in time-frequency analysis such as the bilinear Hilbert transform, and in geometric measure theory such as the bilinear spherical maximal operator fall within this setting. In this project we will study the natural borderline behavior of such objects in weighted Lebesgue spaces and beyond.

-Vector-valued: in parabolic PDEs such as the heat equation, solutions are parameterized over space and time variables. One can interpret these problems as vector-valued ODEs with respect to the time variable, where the vector-space is parameterized over the space variable. This has motivated the study of functions taking values in Banach spaces satisfying the so-called UMD condition; a condition stemming from stochastic analysis, which characterizes extension properties of singular integrals. Our goal is to study UMD spaces in the function space setting, as well as in the limited range and multilinear settings.

-Matrix weights: in multivariate stationary processes, singular integrals of functions taking values in finite dimensional vector-spaces appear naturally. Such processes are described by matrix-valued mapping which can be interpreted as weights. Very recently, a breakthrough has been made in this field through the introduction of convex-set valued analysis. Our goal is to explore this analysis through the lens of lattice structures to obtain new results in all the aforementioned settings.

Resumen del Currículum Vitae:

I obtained my PhD degree in 2021 at the Delft University of Technology in the Netherlands under the supervision of Dorothee Frey. I spent the first three years, from 2016 to 2019, in Delft, and, in 2020, I did a year long stay at the Karlsruhe Institute of Technology in Germany before finishing my degree.

In my first year I published a paper with Dorothee Frey in Journal of Geometric Analysis, where we proved sharp endpoint bounds for non-integral operators. In my second year I, independently, became interested in the longstanding problem of Rubio de Francia type extrapolation in the of multilinear limited range setting. I

discovered a multilinear generalization of the Rubio de Francia algorithm which fully solved the problem including all the endpoint cases and with a sharp dependence of the constant. This resulted in a very influential single author paper that was published in the prestigious Mathematische Annalen.

During the last two years I focused on modernizing the theory of vector-valued singular integrals together with my fellow PhD student Emiel Lorist, resulting in two publications in Journal of Fourier Analysis and Applications and Mathematische Zeitschrift.

Starting in October 2020, I continued my research as a postdoctoral researcher in the Harmonic analysis group at BCAM in Spain under the supervision of Luz Roncal and Carlos Pérez. In my first year I was part of a research proposal for the grant 'Harmonic Analysis and applications to partial differential equations' which was awarded

to us by the Agencia Estatal de Investigación. The project involves extending classical results for singular integrals to more general Banach function spaces and resulted in five publications, one of which was completed during a three week research stay at ICMAT in Madrid.

One of these publications is a single author paper in the prestigious Journal of Functional Analysis. In this paper I mixed deep factorization theorems from the field of partially ordered vector-spaces with the Rubio de Francia extrapolation theorem to prove previously unattainable results in the limited range and multilinear settings in quasi-Banach function spaces.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

In 2022 I was awarded the Juan de la Cierva Formación grant during which I continued developing my research line. Much of the research developed through this grant apply the techniques I developed in my JFA paper, resulting in six publications. including a highly influential short survey on quasi-Banach function spaces, another publication in JFA, and another publication in Math. Ann. in the area of matrix weights. During this time I also established the QuMa conference, an annual conference featuring minority speakers that not only present their research, but also discuss their experiences and activism. The first edition was the first conference in mathematical analysis of its kind.

In 2024 I continued as a postdoc in the Analysis and PDE group at the University of the Basque country. In my year here I have published three more papers, two of which continue my research line into matrix weights respectively with the group of David Cruz-Urbe at the University of Alabama and with the group of Stefanie Petermichl at the University of Würzburg.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: DIAS MATTOS, LETICIA
Referencia: RYC2025-056671-I
Correo Electrónico: leticiadmat@gmail.com
Título: Matematicas

Resumen de la Memoria:

I am a postdoctoral fellow carrying out research in the areas of Extremal and Probabilistic Combinatorics. Currently, my main focus is on random matrices, Ramsey and extremal properties of the random graph $G(n,p)$, random graph processes, hyperplane covers of the hypercube and counting methods.

In many areas of mathematics, a recurring theme is to capture intricate global behaviour by imposing simple local rules. Classic instances of the local-to-global philosophy include sphere-packings and tilings in Euclidean space, Boolean satisfiability in computer science, cellular automata, and models from statistical physics. I have investigated and I plan to keep investigating that same perspective in additive combinatorics and graph theory, with a particular focus on packing and covering problems and appearance of small subgraphs, both in settings governed by an ambient group and in purely combinatorial contexts.

To date, I have completed 14 papers and preprints, and 2 extended abstracts, several of which have appeared or been accepted in leading journals such as *Combinatorica*, *Duke Math. J.*, *Israel J. of Math.*, *J. of Combin. Theory B*, *Math. Proc. Cambridge Phil. Soc.* and *RSA*. I consider my key research publications to be:

- M. Campos, L. Mattos, R. Morris and N. Morrison, On the singularity of random symmetric matrices, *Duke Math. J.*, 170 (2021), 881–907.
- J. Balogh, F. C. Clemen and L. Mattos, Counting r -graphs without forbidden configurations, *J. of Combin. Theory B*, 157 (2022), 216–234.
- S. Griffiths and L. Mattos, Clique packings in random graphs, *Combinatorica*, 45 (2025), 45–63.
- P. Araujo and L. Mattos, Local central limit theorem for triangle counts in sparse random graphs, *Math. Proc. Cambridge Phil. Soc.*, to appear.
- D. Liu, L. Mattos, T. Szabó, On the number of sets with small sumset, *Israel Journal of Mathematics*, to appear.

Plenary invitations are among the highlights of my expository activity. To mention a few, I was fortunate to be one of only two plenary speakers at the Berlin–Poznań–Hamburg–Warsaw Seminar in Discrete Mathematics 2024. I have also given a plenary talk at the conference *Extremal Graphs and Hypergraphs* (invitation-only, 2024) at Institut Mittag-Leffler; and in 2025 I was a plenary speaker at the Second Brazilian School of Combinatorics at IMPA. I have also given talks at some of the largest international conferences in my field, such as *Random Structures and Algorithms* (2022 and 2025), the *British Combinatorial Conference* (2022) and *EuroComb* (2025).

I have also co-supervised, together with Prof. T. Szabó, a master student on a topic that I proposed. Our work together resulted in a paper published in the *Israel J. Math.* In addition, I have gained broad teaching experience at both undergraduate and graduate levels in recent years. At FU Berlin, I designed and taught a graduate course on the container method, a powerful technique developed about ten years ago by Balogh, Morris and Samotij, and independently by Saxton and Thomason, to solve counting problems in extremal combinatorics. At UIUC, I taught multiple sections of undergraduate courses in Fundamental Mathematics, Basic Discrete Mathematics and Introduction to Combinatorics. At the University of Heidelberg, I have taught two sections of the undergraduate course *Discrete Structures I*.

Resumen del Currículum Vitae:

I obtained my PhD in 2021 from the Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, under the supervision of Professor Robert Morris. My thesis, *Combinatorial properties of random graphs and matrices*, defended in June 2021, was very well received in the mathematical community and earned several prizes. These include the CAPES thesis award for the best PhD thesis in mathematics defended in Brazil in 2021, and an honourable mention in the Gutierrez Prize, awarded jointly by the Brazilian Mathematical Society (SBM) and the University of São Paulo (USP).

Following my PhD, in 2021–2022 I held a Dirichlet Postdoctoral Fellowship at the Freie Universität Berlin in the group of Professor Tibor Szabó, and in 2023 I was a J.L. Doob Research Assistant Professor at the University of Illinois at Urbana–Champaign. While in the USA, I received an AMS–Simons travel grant (US\$6k in total), a two-year award given to outstanding early-career applicants to support research-related travel activities. I am currently based at University of Heidelberg, supervised by Professor Felix Joos, and I have been recently awarded a Humboldt fellowship (€70k in total) in Germany, a programme open to all nationalities and research areas. This fellowship is regarded as very prestigious and competitive, as only about 20% of applications are typically approved.

I have an excellent publication track record that includes 14 papers published/submitted in prestigious general math journals, such as *Duke Math. J.*, *Israel J. of Math.* and *Math. Proc. Cambridge Phil. Soc.*, and leading specialised journals, such as *Combinatorica*, *J. Comb. Theory B*, and *Random Struct. Algorithms*. I also have 2 extended abstracts that appeared at Eurocomb, one of the largest and most important international conferences in combinatorics. My work has been disseminated through more than 30 research talks, including the most important conferences in my field, such as the *British Combinatorial Conference*, *EuroComb* and *RS&A*. See also Section C.2 for a list of workshops and other international events that I have



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

attended. In addition, my collaborative profile allowed me to develop projects with 23 co-authors, and my strong research profile has led to my being invited to give several plenary talks and attend many invitation-only events at prestigious institutions, such as the MFO Oberwolfach in Germany (2022 and 2025), the Institute of Basic Sciences in South Korea (2023), Banff in Canada (2024 and 2025) and the Institut Mittag-Leffler in Sweden (2024).

In recent years, I have gained broad teaching experience by lecturing 7 courses at undergraduate and graduate levels. I was also very fortunate to co-supervise a Master's thesis in 2023 with Professor Tibor Szabó at Freie Universität Berlin. This collaboration was highly successful and led to a joint paper with the student on the number of sets with small sumset, in which we developed a new container theorem tailored to additive combinatorics. The paper has been accepted for publication in the Israel Math. J.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: LENZI, AMANDA
Referencia: RYC2025-054968-I
Correo Electrónico: lenzi.amanda88@gmail.com
Título: Neural Simulation-Based Inference and Scalable Spatial Statistics for Climate, Environment, and Energy Systems

Resumen de la Memoria:

My research lies at the intersection of spatiotemporal statistics, computational methods, machine learning, and environmental applications. Their main contributions include the development of simulation-based inference (SBI) methods for statistical models with intractable likelihoods, where they pioneered neural-network approaches for parameter estimation in complex spatial and extreme-value models. This work has led to influential publications, including a highly cited Computational Statistics & Data Analysis paper (2023) that introduced the first ML framework for inference in intractable models, and a follow-up (2024) extending the methodology to cases with unknown sampling precision. They have also contributed to neural likelihood approximations for spatial processes, improving inference in high-dimensional problems.

A second major line of work concerns scalable spatial and spatiotemporal modelling via the INLA-SPDE framework. The applicant co-authored the leading reference book on SPDE-based models, widely used across academia, government, and industry. Their methodological contributions include new approaches for nonstationary environmental data and efficient Bayesian inference in large spatial systems.

A third area focuses on renewable-energy forecasting and power-system resilience. They developed spatiotemporal and probabilistic models for wind power, new Lagrangian cross-covariance constructions published in JASA, Bayesian decision tools for anticipating grid frequency excursions, and accessible outreach work such as the Significance article "How statistics keeps the lights on."

The applicant has a highly international trajectory, with academic experience in Brazil, Canada, Denmark, Norway, Cyprus, Saudi Arabia, the United States, and the United Kingdom. They have collaborated with leading figures in spatial statistics, extremes, machine learning, and energy systems, generating publications in top journals (AoAS, JASA, JCGS). They maintain active collaborations across Europe and the US, have hosted international PhD students, delivered over 20 invited talks, and secured competitive international seed funding.

They demonstrate independence through leading original research lines, particularly SBI with neural networks, PI roles in funded projects, the initiation of new collaborations, and supervision of PhD students and interdisciplinary researchers. They also hold leadership roles in training and academic community building, including serving as Academic Cohort Lead for two MSc programmes and organising major events such as ASA DataFest.

The proposed research programme will advance statistical and machine-learning tools for complex environmental and societal systems, centred on four components: (1) new neural SBI methods for spatial and spatiotemporal models; (2) scalable Bayesian methods for spatial extremes and compound climate risks; (3) probabilistic modelling for renewable-energy forecasting and power-system resilience; and (4) neural point-process models for environmental health and epidemiology. The programme includes open-source software, reproducible pipelines, and training material to strengthen Spain's capacity in modern spatial statistics and environmental data science. The Ramón y Cajal fellowship would provide the foundation for establishing this long-term, internationally competitive line of research.

Resumen del Currículum Vitae:

I am a Lecturer in Statistics at the University of Edinburgh working on computational and spatiotemporal statistics, machine learning, and applications in energy, climate, and environmental systems. My research develops scalable methods for inference and prediction in large, complex datasets. I completed my PhD at the Technical University of Denmark and held postdoctoral positions at KAUST and Argonne National Laboratory, forming long-term collaborations with leading researchers including Marc Genton, Håvard Rue, Michael Stein, and Brian Reich.

A major contribution of my career is pioneering simulation-based inference (SBI) with neural networks for intractable statistical models, introducing some of the first likelihood-free methods for spatial and spatiotemporal settings. My first paper in this area has over 80 citations and initiated a growing research line. I continue to advance SBI through new theoretical results, open-source tools, and contributions to the BayesFlow framework. This work has led to more than 20 invited talks at international conferences and institutions.

I demonstrate leadership as Associate Editor of the Journal of Computational and Graphical Statistics, member of the EnvEcoStats scientific committee, and organiser of invited sessions at the Royal Statistical Society Conference. I supervise four PhD students across Statistics, Informatics, and Geosciences, promoting interdisciplinary training.

I have obtained competitive funding as PI, including the Glasgow RIS International Collaboration Grant (2025), the Big Ideas Accelerator (2024), and an international seed grant with NC State University (2023-2024). I also collaborate on a long-term AEI-funded project on spatiotemporal modelling (2025-2029).

My applied work spans wind-energy forecasting, renewable-energy integration, and grid stability. I co-authored a Significance article on preventing blackouts, highlighting the societal impact of my research. I maintain active collaborations across Europe and North America.

As Academic Cohort Lead for the MSc in Statistics & Data Science, I oversee over 150 students annually, and I organised the 2024 ASA DataFest in Edinburgh. My career is strongly international, with research visits and collaborations in Spain, Denmark, Norway, Saudi Arabia, the United States, and the United Kingdom.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: MARTIN MERCHAN, LUCIA
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Título: Geometric and topological aspects of G2 and Spin(7) structures

Resumen de la Memoria:

My research focuses on geometric structures on Riemannian manifolds, particularly those associated with the exceptional holonomy groups G2 and Spin(7) in dimensions 7 and 8. My work combines several tools and perspectives.

During my Ph.D. thesis, I used spinor geometry to study Spin(7) structures and provide several new examples using these tools together with Lie group theory. I also studied algebraic resolutions and, combined with analytic tools, applied them to prove general theorems on resolutions of symplectic 4-orbifolds and closed G2 structures. For an example of a closed G2 manifold using the theorem, I also employed techniques from rational homotopy theory to discard the existence of a parallel G2 structure.

My 3 international postdocs were supervised by experts in G2 geometry, with complementary expertise. At U. Turin, with A. Fino, I applied left-invariant techniques to study certain equations for G2 structures, one geometric, and other motivated by high-energy physics.

At U. Waterloo (Canada), I worked with S. Karigiannis on calibrated submanifolds, twistor spaces and nearly Kähler manifolds. In addition, I pursued an independent project related to my Ph.D. thesis; the outcome was disproving a 30-year old conjecture by providing the first example of a compact holonomy G2 manifold that is not formal. This result hints, in particular, that G2 geometry is more flexible than Kähler geometry.

Since January 2025, I work at U. Humboldt Berlin with T. Walpuski. He is an expert on Gauge theory, and I am currently learning geometric analysis to work in a joint project with him. I also started a new research line, together with J. Stelzig (Munich) on pluripotential homotopy theory for complex manifolds. I also finished a project, started at U. Waterloo, where I open a new research direction. This also required me doing explicit computations of characteristic classes and the Bianchi-Massey (rational homotopy), which I had not carried out before.

My future research projects can be divided into 4 topics: 1) Exploring the frontier between closed G2 structures and those with holonomy G2 (compact), where I proposed 5 projects, 2 of which should be pursued by a Ph.D. student under my supervision. 2) Gauge theory for holonomy G2 manifolds, with T. Walpuski 3) Pluripotential homotopy theory, with J. Stelzig, 4) Holonomy Spin(7); a project on my own, trying to find a compact non-formal example, and the other on twistor spaces together with S. Karigiannis.

Resumen del Currículum Vitae:

I completed my B.Sc. in 2016 (U. Málaga), receiving two awards for academic excellence. During my final year, I held a government collaboration grant and a summer research fellowship at ICMAT. I continued my M.Sc. in Advanced Mathematics at UCM (2016–2017), while collaborating with ICMAT through a Severo-Ochoa CSIC collaboration grant. I obtained an FPU contract for my Ph.D., defended in U. Málaga in December 2021. My thesis, Spin(7) structures, spinors and nilmanifolds, was awarded with the Ph.D. Price in Mathematics at U. Málaga. During this period, I completed two (2 months) research stays, with A. Fino and I. Agricola.

I have held three competitive postdoctoral positions with leading experts in G2 geometry: a one-year contract in U. Turin, a 2-year fellowship in U. Waterloo (Canada), including teaching responsibilities and travel support, and since January 2025, a Dirichlet postdoc in Humboldt U. Berlin supported by Germany's Excellence Strategy.

Among my 12 contributions, the most significant is a single-authored paper disproving a conjecture on the rational homotopy type of compact holonomy G2 manifolds, inspired by the work of Deligne, Griffiths, Morgan, and Sullivan (1975). My article is currently accepted in Geom. Topol., and led to multiple seminar invitations and talks at international workshops.

My research employs techniques including orbifold resolutions, spin geometry, geometric structures with torsion, calibrated submanifolds, Lie theory, rational homotopy theory, and algebraic geometry. My publications appear in Ann. Sc. Norm. Sup. Pisa, Math. Z., Math. Nach., Ann. Mat. Pura Appl., Comm. Anal. Geom., Ann. Glob. Anal. Geom., and J. Sympl. Geom. Among these, I have 4 solo-authored papers, and 11 collaborators.

I have delivered plenary talks at 4 prestigious international centers (AIM, BIRS, CRM Montreal, CMO-BIRS) and invited seminars at 12 universities across 6 countries. I have taught 4 undergraduate courses as main instructor in Canada, and 5 as teaching assistant in Spain.

I have been supported through 5 projects, 3 national and 2 international.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: MUDARRA DÍAZ-MALAGUILLA, CARLOS
Referencia: RYC2025-054883-I
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Título: Weights theory in complex and harmonic analysis
Resumen de la Memoria:

I have carried out top quality research in two completely different areas. After defending my PhD thesis on smooth analysis on Banach spaces in 2018, I started a completely different research program on harmonic analysis, thus becoming an expert on both areas. Therefore, my expertise include a wide range of topics: convex analysis, functional analysis, extensions of Lipschitz maps, Muckenhoupt weights, Bergman spaces, Békollé-Bonami weights, BMO functions, fractals, porosity, Littlewood-Paley formulae, reverse Hölder inequalities, smooth approximation, Whitney-type problems

My research results can be classified into two main areas:

Harmonic analysis:

- 1) Full characterizations between all the weight classes in the disk;
- 2) Construction (via distance to fractals) of new families of doubling weights outside A_{∞} ;
- 3) Approximation and extension for the fractional Vanishing Mean Oscillation classes even in the Banach space-setting;
- 4) Fractal characterizations of sets whose distances give rise to A_1 weights;
- 5) Characterizations of reverse Hölder inequalities in metric spaces;
- 6) Extension of A_p weights in metric spaces

Functional analysis:

- 1) Construction of the first Lipschitz-preserving extension operator for convex C^1 and $C^{1,w}$ functions in Banach spaces;
- 2) The first extension operator for $C^{1,w}$ jets in infinite dimensional spaces;
- 3) Full solution to the C^1 and $C^{1,w}$ Whitney extension problem for convex functions;
- 4) The Kirsbraun's extension theorem via an explicit formula;
- 5) Smooth approximation of Lipschitz functions preserving boundary values in Banach spaces;
- 6) Smooth and global approximation of convex functions in Banach spaces.

The main research objectives in the coming years are:

(I) Develop new tools that allow to derive sharp forms of the reverse Hölder inequality for Muckenhoupt weights, and to obtain the sharp decay of the exponential-integrability of $BMO(\mathbb{R}^n)$ functions with the dimension.

(II) Find the precise geometry of an extension domain for A_p weights. At the same time, we will derive a sharp form of the classical Wolff's theorem. We will also find linear bounded extension operators for BMO functions in arbitrary sets, substituting the (very non explicit) classical extensions which relied on A_{∞} weights.

(III) Find new sharp conditions for a weight W in the unit disc, so that the Littlewood-Paley formula for W -weighted Bergman functions hold.

Resumen del Currículum Vitae:

I have written 20 research papers: 18 published, 2 preprints. This includes solo papers, papers in collaboration with Master and Doctoral students, with postdocs, and with distinguished experts. My publications include: Adv. Math. (x2); Analysis & PDE; Calc. Var. Partial Differential Equations; J. Funct. Anal. (x2); J. Geom. Anal.; J. Optim. Theory Appl.; Math. Z.; Nonlinear Anal.; Proc. Lond. Math. Soc.; Proc. Roy. Soc. Edinburgh Sect. A

I had postdoctoral stays at Aalto University, University of Jyväskylä, and NTNU. I have also had visits at Université de Bordeaux and Universitat Autònoma de Barcelona. I have given numerous plenary and contributed talks in prestigious international conferences, as well as plenty of invited seminar talks.

Research Funding: I got the prestigious Marie Curie (MSCA-EF) European Fellowship 2023, from the European Commission, with score: 98,4 out of 100 points. I use this individual grant to carry out my project Geometric and harmonic analysis for weights, at the NTNU, in Norway. I have been member of several projects on analysis in Norway, Finland, and Spain. I got a 4-year PhD grant from La Caixa-Severo Ochoa International PhD program in 2014-2018.

Awards. I got the Vicent Caselles Mathematical Research Award 2019, by the Spanish Mathematical Society and the FBBVA, to the best Spanish mathematicians under 30. I also got the Extraordinary PhD Award in Mathematics by the Universidad Complutense de Madrid, to the best PhD dissertation in 2017-2018

Supervision and training: At Aalto University (2019-2021), I collaborated with the PhD student Emma K. Kurki, monitoring her progress and acting de facto as her second PhD advisor. Currently, at NTNU, I am the advisor of the Master Student, with whom I have written a paper. I am also supervising 4 bachelor theses at NTNU as well. These 5 theses will be defended in the Spring 2026. I also supervised a Bachelor Thesis at the University of Jyväskylä (2023)



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

Teaching: At NTNU, I have lectured courses at level: PhD (Harmonic Analysis), Master (Linear Methods, Complex Analysis), Bachelor (Complex Function Theory and Diff. Equ.). I have elaborated my own teaching material, writing my own lecture notes of two courses, available on my webpage

Other services: I am in the organizing committee of the National Meeting for Mathematicians in Norway, to be held in September 2026. I have been reviewer for numerous research papers in international journals, as well as for books and papers in Mathematical Reviews.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: FARIÑA BIASI, ANXO
Referencia: RYC2025-055518-I
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Título: Deterministic dynamics in nonlinear Hamiltonian equations

Resumen de la Memoria:

My scientific trajectory has been shaped by the goal of developing a rigorous deterministic framework for understanding nonlinear Hamiltonian partial differential equations (PDEs), especially in regimes that exhibit turbulent-like dynamics. Since my PhD, I have pursued an independent research direction distinct from that of my supervisor, centered on analytically describing energy transfer across scales, the formation of coherent structures, and singularity-driven relaxation processes in Hamiltonian systems.

As a postdoctoral researcher at the Jagiellonian University, I consolidated my scientific independence by leading all my projects and producing several corresponding-author works on Sobolev-norm growth, finite-time blow-up, and coherent dynamics. This period established the core of my research line: identifying deterministic mechanisms underlying multiscale behavior in nonlinear PDEs, in contrast with classical statistical approaches. I further broadened my thematic scope by exploring applications to cosmology, fluid mechanics, and Bose-Einstein condensates, while maintaining a rigorous mathematical perspective.

My subsequent Junior Research Chair Fellowship at École Normale Supérieure-PSL marked the beginning of my experience as a solo PI, leading independent projects and expanding my international presence. There, I produced additional single-author and corresponding-author publications and developed new analytic frameworks for resonant and weakly nonlinear dynamics. This work led to my integration into a major international research network.

Currently, as a Junior Leader of la Caixa Fellow, I lead a research team focused on advancing the theory of nonlinear Hamiltonian PDEs. My research line centers on three interconnected problems: (1) deterministic mechanisms of energy transfer and Sobolev-norm growth; (2) the emergence of coherent structures and the breakdown of statistical independence; and (3) singularity formation as an effective relaxation process in energy-conserving systems. Together, these themes aim to establish a unified analytic framework for turbulent-like dynamics in Hamiltonian PDEs, with implications for nonlinear waves, fluid mechanics, cold-atom physics, and general relativity.

Resumen del Currículum Vitae:

I am a Junior Leader of la Caixa Fellow (305k€), leading a research team in mathematical physics at the University of Santiago de Compostela. I specialize in nonlinear Hamiltonian PDEs and have authored 16 publications in top-tier journals in mathematics and physics, including Analysis & PDE, Communications in Mathematical Physics, and Physical Review Letters. My scientific production includes single-author and corresponding-author papers, and has accumulated 334 citations and an h-index of 12 (Google Scholar).

I have demonstrated strong capacity to attract competitive funding, securing four research-independent fellowships totaling 700k€: Junior Leader of la Caixa Fellowship, Marie Skłodowska-Curie Postdoctoral Fellowship, SISSA Mathematical Fellowship, and the Junior Research Chair Fellowship. My work has also been recognized through invited talks at international meetings and my integration into networks of world-leading experts in the field.

My career is highly international. I completed a 3-year postdoc in Poland, followed by 2 years as a solo PI at ENS-PSL in France, and I now hold an independent fellowship in Spain. I have carried out research activities across three continents, collaborated with researchers across the globe, co-organized three international conferences, and visited prestigious international institutions such as ETH Zürich.

In terms of leadership, supervised bachelor, master, and research-initiation students, mentored undergraduates, hired a postdoctoral researcher, and coordinated the IGFAE master's fellowship program. I have also served on recruitment and PhD evaluation panels and reviewed manuscripts for peer-reviewed international journals in both mathematics and physics.

My outreach activities include widely disseminated science communication (estimated reach +2M people), a first-prize award in a science communication competition, collaborations with major media outlets, and engagement with high schools and radio programs.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: LINARES BALLESTEROS, PABLO
Referencia: RYC2025-057135-I
Correo Electrónico: pablo.linares95@gmail.com
Título: Rough paths and regularity structures: Theory and applications
Resumen de la Memoria:

Aspectos algebraicos y probabilísticos de estructuras de regularidad.

Desde el lado probabilístico, el principal resultado es un método inductivo de construcción de un modelo renormalizado basado en una desigualdad de tipo "spectral gap". Este resultado es el primer método alternativo a (Chandra&Hairer, 2016) y supone una perspectiva alternativa y más fácilmente generalizable. Los resultados se recogen en un artículo en Invent. Math. en colaboración con Otto, Tempelmayr y Tsatsoulis (2024).

Desde el lado algebraico, los principales resultados del candidato incluyen la construcción y propiedades de estructuras algebraicas ligadas a rough paths y estructuras de regularidad (structure group, renormalization group) basadas en multi-índices, y su relación con aquellas basadas en árboles. Se recogen en tres artículos:

- L., Otto, Tempelmayr 2023 en Commun. Am. Math. Soc. Primera construcción de un structure group basado en un conjunto combinatorio diferente a los árboles (Hairer et. al.) para una ecuación cuasi-lineal.
- Bruned, L. 2024 en Arch. Ration. Mech. Anal. Sistematización de la construcción anterior para tratar ecuaciones semi-lineales genéricas. Establecimiento de un procedimiento inductivo de renormalización algebraica basado en multi-índices.
- L. 2023, aceptado en Ann. Inst. Henri Poincaré Probab. Stat. Identificación del grupo de renormalización/traslación para rough paths basados en multi-índices y su morfismo de álgebras pre-Lie con respecto a árboles. Identificación del álgebra pre-Lie de multi-índices con el álgebra de Novikov libre.

Se propone una línea de investigación orientada a problemas multi-escala en dinámicas estocásticas basadas en rough paths y estructuras de regularidad, en línea con corrientes actuales de estudio cualitativo de soluciones a S(P)DEs rugosas y singulares. Más concretamente:

- Convergencia a la media en sistemas rápido-lentos de ecuaciones con ruido fraccionario. Continuando con el trabajo fundacional (Hairer&Li, 2020), se propone el estudio de métodos numéricos que preserven la propiedad de convergencia.
- Generación de difusiones a partir de dinámicas rugosas no Markovianas. Continuando con el trabajo (Hairer&Li, 2022), se propone la extensión de la creación de difusiones a partir de sistemas rápido-lentos conducidos por movimientos brownianos fraccionarios a los casos más singulares (con explosión de varianza) y fuera de la estacionariedad.
- SPDEs singulares con campos correlacionados. Extensión de la técnica introducida para construir modelos en ϕ^4_2 con campos correlacionados (Clozeau&Singh 2025) a SPDEs como PAM o SNLW, lo que sentaría las bases para un desarrollo posterior (a largo plazo) de una teoría de homogeneización estocástica de SPDEs singulares.

Resumen del Currículum Vitae:

Grado y Máster en Matemáticas por la Universidad Autónoma de Madrid. Beca de Máster Severo Ochoa-ICMAT.

2022 Doctor en Matemáticas por la Universidad de Leipzig (dir. Felix Otto, Instituto Max Planck), con tesis "On a tree-free approach to regularity structures for quasi-linear stochastic partial differential equations". Summa cum laude.

2022-2024 Postdoc en Imperial College London, grupo de Análisis Estocástico, en el proyecto "Multi-Scale Stochastic Dynamics with Fractional Noise" (investigadora principal Xue-Mei Li).

2024- Profesor Ayudante Doctor en la Universidad Autónoma de Madrid.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: BODE, BENJAMIN
Referencia: RYC2025-055904-I
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Título: Knots in the context of singularities and physical systems
Resumen de la Memoria:

The mathematical area of topology is concerned with properties of an object that do not change when it is continuously deformed. This includes the branch of knot theory, where the objects in question are mathematical knots.

My research focuses mainly on two applications of knot theory in different areas: first, the study and theoretical construction of configurations of physical systems that contain knots in one way or another, and second, the construction of polynomial maps whose zeros are in some sense knotted.

During my PhD I developed an algorithm that takes as input any link L and produces a polynomial map from $\mathbb{R}^3$ to $\mathbb{R}^2$ whose zeros form the given link L . This has important applications, as it allows for the explicit construction of knotted initial configurations in a wide range of physical systems.

Later I obtained results on topological properties of electromagnetic fields. Such a field consists of two time-dependent vector fields on $\mathbb{R}^3$, the electric field and the magnetic field, that together satisfy Maxwell's equations in vacuum.

There is a formalism by Bateman that relates electromagnetic fields whose periodic orbits maintain their link type for all time to holomorphic functions in two variables. By finding a new interpretation of Bateman's work in terms of contact topology I proved that every link arises as a periodic orbit in such a field.

Most recently, I found a construction of optical vortex knots, i.e., solutions to the paraxial wave equation (which can be interpreted as laser beams) whose zeros form a given knot type. In collaboration with physicists from UPenn we also found mathematical descriptions of configurations of liquid crystals with knotted defect lines.

The second important line of my research is the study of links of singularities. In analogy with the study of links of isolated singularities of complex plane curves, we can study singularities of real polynomial maps. We say that a link L is real algebraic if there is a polynomial map f from $\mathbb{R}^4$ to $\mathbb{R}^2$ with an isolated singularity at the origin and with the property that every sufficiently small 3-sphere around the origin intersects the vanishing set of f in the link L .

A conjecture by Benedetti and Shiota states that a link should be real algebraic if and only if it is fibered.

In various articles I proved that certain infinite families of fibered links are indeed real algebraic. In particular, every link is a sublink of a real algebraic link.

I also completely characterised the family of links that can be obtained from a certain class of polynomials ("non-degenerate") in terms of some simple symmetry constraints.

Motivated by different considerations about real algebraic links I introduced the notion of a P -fibered braid. It is one of four (a priori) different definitions of a "braided open book" on the 3-sphere, which I showed to be equivalent to each other.

If my application should be selected I intend to follow four main research objectives. I want to prove the conjecture by Benedetti and Shiota, generalise the notion of braided open books to general 3-manifolds and higher dimensions, to generalise our study of configurations of smectic liquid crystals with knotted defect lines, and adapt my construction of optical vortex knots to a construction of quantum vortex knots with a prescribed time evolution.

Resumen del Currículum Vitae:

I completed my PhD at the University of Bristol (UK) under the supervision of Mark Dennis and Jonathan Robbins in 2018. The title of my thesis was Knotted fields and real algebraic links. It led to several publications in journals, some in collaboration with my supervisors, some as single-author papers. One of the most significant result from this time is an algorithm that takes as input any link L and produces a polynomial map from $\mathbb{R}^3$ to $\mathbb{R}^2$ whose zeros form the given link L . This has important applications, as it allows for the explicit construction of knotted initial configurations in a wide range of physical systems.

After my PhD I was awarded a 2-year JSPS International Postdoctoral Fellowship by the Japanese Society for the Promotion of Science. It allowed me to work on my own research project at Osaka City University and Osaka University from 2018 to 2020.

I investigated connections between the polynomial construction from my PhD with singularity theory, which led to constructions of infinite families of new real algebraic links.

In 2021 I joined the ICMAT in Madrid as a Severo Ochoa postdoc. Here I proved that every link arises as a set of stable field lines (periodic orbits) in an electromagnetic field. The result was published in Communications in Mathematical Physics.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

After this, I won a Marie Skłodowska-Curie Postdoctoral Fellowship (MSCA) as part of the Horizon 2020 programme funded by the European Union, which I started in March 2022. It gave me the opportunity to establish myself as an independent researcher in Europe. Together with Daniel Peralta-Salas I was working on knots in the context of different dynamical systems, often motivated by mathematical physics.

At the ICMAT I was a co-organiser of the Geometry Seminar, which regularly hosts national and international speakers. I have also been a reviewer/referee for the journals Journal of Physics A, Revista Matemática Complutense, Communications in Analysis and Geometry, Sao Paulo Journal of Mathematics, Research in the Mathematical Sciences and Topology and its Applications, as well as the online review database zbmath.

In addition to numerous papers and preprints, my work has also been disseminated via a long list of talks and presentations at conferences, workshops and seminars, among them eight invited talks at conferences. Together with the ICMAT's outreach team I have also produced a youtube video and a newspaper article in order to engage a broader audience in the general public.

During my Marie Curie Fellowship I volunteered to teach the Curso Avanzado de Geometría of the Master course at the Universidad Autónoma de Madrid in the summer semester 2023. The classes focus on symplectic geometry using a syllabus that I designed myself.

Since February 2024 I am an Assistant Professor at the Universidad Politécnica de Madrid, where I teach mathematics first-year engineering students (Linear Algebra and Calculus 2) and MSc Mathematics (Algebraic Topology) students and continue my research on knots, obtaining results in topology, singularity theory and theoretical physics.

Since September 2025 I have joint supervision with Prof. Raimundo Araújo dos Santos from the University of Sao Paulo at Sao Carlos, Brazil, of a master student and two PhD students.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: DECIO, STEFANO
Referencia: RYC2025-056462-I
Correo Electrónico: stefano.decio@math.ethz.ch
Título: Zeros, oscillations and rough boundaries: Fine properties of elliptic PDEs

Resumen de la Memoria:

My research is about fine properties of solutions to partial differential equations, mainly of elliptic type. I am interested in growth, zeros, oscillations and localization of such objects. To investigate these properties, I have used, among others, techniques coming from harmonic analysis and geometric measure theory. One of my focus is understanding zero sets and growth of solutions to elliptic PDEs. To study this, I used tools stemming from quantitative unique continuation; informally, this means that if a solution to an elliptic PDE is small in some set, then it has to also be small in a larger set, i.e. solutions to elliptic PDEs do not grow too wildly. This has naturally led me to the study of harmonic measure. In particular, I have been studying a variant of harmonic measure that reproduces harmonic functions from their Robin boundary data, which is a combination of the function and its normal derivative. Probabilistically, this should correspond to the boundary hitting probability of a partially reflecting Brownian motion. The problem models diffusion through a semi-permeable membrane, such as air circulation in the lungs, and has been studied in the physics literature. One could view this problem as asking: what does a Brownian particle see? Robin boundary conditions arise naturally in physics, engineering, and biology as an interpolation between Dirichlet (absorption) and Neumann (reflection) boundary behaviors. My works establish the basis for a robust elliptic theory of the Robin problem. Among others, we establish the surprising result that Robin harmonic measure, which we construct for the first time, is mutually absolutely continuous with respect to surface measure, under very mild regularity assumptions. This behavior is in stark contrast to the Dirichlet case. Probabilistically, the Dirichlet problem is connected to the exit distribution of Brownian motion (the classical theorem of Kakutani). For Robin problems the probabilistic analog is much less clear, especially in the rough domains we deal with. One of my main goals for the next years is to elucidate the connection between our PDE results and stochastic processes such as partially reflected Brownian motion and local time at the boundary. A model result would be a Kakutani-type theorem for partially reflected Brownian motion. I am intrigued by the potential explanations a probabilistic approach could give to some of the surprising phenomena we uncovered for the Robin harmonic measure.

I also plan to continue my study of nodal sets of solutions to elliptic PDEs and of classical questions of unique continuation; in particular, the Steklov eigenvalue problem I studied has gained a lot of traction in recent years due to its features being intermediate between a local and a nonlocal problem. Through my work on harmonic measure, I gained a new appreciation of the subtlety of boundary regularity issues, which could prove fruitful in dealing with some questions outlined in the scientific report. Recently I had the opportunity to get acquainted with some powerful techniques in geometric measure theory and to explore the topic of unique continuation in a more geometric setting. I plan to continue exploring unique continuation questions coming from geometric-variational problems.

Resumen del Currículum Vitae:

After undergraduate studies at the University of Milan, I obtained my PhD at the Norwegian University of Science and Technology under the guidance of Professor Eugenia Malinnikova in June 2022, with a thesis titled "Nodal geometry and growth of solutions to elliptic partial differential equations". After graduation, I conducted postdoctoral research at the University of Minnesota, where I was mentored by Professor Svitlana Mayboroda, and at the Institute for Advanced Studies in Princeton, mentored by Professor Camillo de Lellis. I am currently a postdoctoral researcher at ETH in Zurich. My research concerns harmonic functions and solutions to other elliptic PDEs such as Laplace eigenfunctions; the area intersects considerably with differential geometry, geometric measure theory and harmonic analysis. I have obtained several important results in the theory of elliptic PDEs; in particular, in my PhD thesis I studied an eigenvalue problem known as the Steklov problem and I proved the strongest results to date on the zeros of Steklov eigenfunctions. I also established results on zeros of linear combinations of Laplace eigenfunctions. Together with my PhD advisor we established a very delicate inequality for Laplace eigenfunctions, called a Bernstein inequality; such inequalities are classical for polynomials and were conjectured to hold for eigenfunctions more than 40 years ago. In my postdoctoral work, in collaboration with top international researchers, I developed the first comprehensive elliptic theory for uniformly elliptic partial differential equation with Robin boundary conditions in domains of very low regularity and proved very surprising results about an object called Robin harmonic measure. Through this work, we also confirm a conjecture put forth in the physics literature about air circulation in human lungs. During my time as a postdoc at the IAS in Princeton I contributed to the understanding of the unique continuation problem for generalized minimal surfaces; through this, I managed to acquire several sophisticated tools in geometric measure theory. During the course of my career, I travelled a lot both for short and long term international visits. I can single out months long research stays at Princeton University and Stanford University during my PhD, and the participation in a trimester program in Bonn. I was also invited to several international conferences and seminars throughout the US, Europe and Canada. I can single out participation to an Oberwolfach workshop, seminars at Brown, UCLA, University of Washington, Stanford, Princeton, Chicago, Johns Hopkins, conferences of the American Mathematical Society and thematic summer conferences. I have also been very active in teaching across different countries (Italy, Norway, USA, Switzerland), and I taught a wide range of courses from basic courses in linear algebra, through graduate courses in functional analysis, to an advanced summer school on the topic of Laplace eigenfunctions. I have also been very active in service to the mathematics community, being a referee for several top international journals and having organized research seminars and reading courses.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: WEIGT, JULIAN
Referencia: RYC2025-054561-I
Correo Electrónico: jweight@ictp.it
Título: Regularity of Maximal Functions

Resumen de la Memoria:

I do research in analysis. My educational background has an emphasis on harmonic analysis and physics. My research in the past mainly concerned Euclidean real and harmonic analysis and other topics that are connected to partial differential equations, often with geometric aspects. It can be organized along the following three main lines of work:

1. Regularity of Maximal Operators: My main objects of study have been maximal operators. The last three decades have seen the emergence of their regularity theory, which for example concerns Sobolev bounds for the Hardy-Littlewood maximal operator. The main open question in the field is if the gradient of the Hardy-Littlewood maximal function can be controlled by the gradient of the function in $L^1(\mathbb{R}^n)$. This question has been posed two decades ago and remains open in full generality. I have developed new techniques to address this and several related questions. Most notably, I was the first provide a positive answer for any maximal operator in all dimensions. I have proved the endpoint gradient bound for the uncentered Hardy-Littlewood maximal function of a characteristic functions, for the dyadic maximal operator, for cube maximal operators and for fractional maximal operators.

My main goal is to fully solve this problem also for the uncentered and centered Hardy-Littlewood maximal operators.

This problem is already solved in one dimension, where the main open question now is to prove the bound with constant one for the centered Hardy-Littlewood maximal operator.

Together with Constantin Bilz I have succeeded to do so in the case of characteristic functions and aim to generalize my result.

Another related theme is absolute continuity, where one asks if the maximal function of a BV function is in fact Sobolev. In an ongoing project, Panu Lahti and I address this question in several settings.

2. Alberti Representations: More recently I have expanded my work into geometric measure theory. David Bate and I proved that a metric space is n -rectifiable if and only if it has n Alberti representations. Our approach draws on tools from harmonic analysis and PDEs. A critical component of our proof is a quantitative regularity estimate for measures solving a certain PDE. It is related to a Lipschitz variant of the multilinear Kakeya inequality, that here provides a conceptual link between PDE and geometry.

David and I continue investigating variants of the Lipschitz multilinear Kakeya inequality in order to upgrade our rectifiability result to uniform rectifiability, and also because this inequality is interesting in its own right, being connected to research in harmonic analysis on curved Kakeya and Loomis-Whitney inequalities.

3. Geometric Inequalities and Covering Arguments: Elementary geometric tools, such as covering arguments and Poincaré and isoperimetric inequalities, play a central role in my research. Beyond their applications to maximal operators, I have pursued these topics independently: With coauthors I have proved a weighted fractional Poincaré inequality, and, very recently, a covering theorem that concerns the boundary.

Earlier in my career, I also studied perturbations of the Haar basis.

Resumen del Currículum Vitae:

After finishing high school in Hamburg, Germany I have obtained my undergraduate degrees in physics and mathematics from the University of Jena, Germany. Due to my studies of physics my point of view to mathematics developed not only from a purely abstract standpoint. This both informed my interest in mathematics, and provided me with additional intuition towards my proof approaches. I subsequently had my first international academic experience as an Erasmus exchange student at Lund University in Sweden for a year. Afterwards I returned to Germany to obtain my Master's degree at the University of Bonn and published my first article.

I pursued my doctoral degree at Aalto University in Finland. My goal was to study the regularity of maximal functions with Juha Kinnunen, who pioneered this field. Under his supervision I developed several new approaches to this topic which lead to breakthrough results. I secured personal research grants for three of my four years of doctoral studies, and received the Aalto University doctoral thesis award 2023 in the School of Science for my PhD thesis. The field of regularity of maximal functions has remained my main research area to this day. During this time I also formed collaborations with various international researchers and published in related fields such as on Poincaré inequalities.

For my first postdoctoral position I decided to widen my research to geometric measure theory and take up a postdoctoral position with David Bate at the University of Warwick in the UK. Our project was on rectifiability in metric spaces, which we succeeded to conclude after more than two years of research. A key tool that we developed turned out to be related to a Lipschitz variant of the multilinear Kakeya inequality. It is now my second main theme of research and David and I continue studying follow up questions.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I realized however that my skills apply more effectively in topics in Euclidean space. This is why I decided to shift my focus back to maximal functions. For my second postdoctoral position I obtained a Marie Skłodowska-Curie fellowship to work with Emanuel Carneiro at the UNESCO institution ICTP in Trieste, Italy. The goal is to prove sharp bounds for maximal functions.

I have been teaching throughout all stages of my academic career. I started teaching in the beginning of my third year of studies and have continued to do so until the end of my doctoral studies with little interruptions. During my undergraduate studies in Germany I have been running exercise sessions for five different lecture courses. As a doctoral student I had the role of head teaching assistant for nine different lecture courses. At ICTP I am have been the responsible lecturer for the lecture course in Real Analysis.

I have found much joy in both research and teaching during my academic career. I see research, teaching and supervision as equally important ways how I can contribute best to society.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: FANG , ALLEN JUNTAO
Referencia: RYC2025-055129-I
Correo Electrónico: allen.j.fang@proton.me
Título: Dynamics and characterizations of black hole spacetimes

Resumen de la Memoria:

The theory of general relativity is one of the most successful theories in modern physics. Despite the monumental progress made in general relativity across physics and mathematics since its introduction over a century ago by Albert Einstein, many fundamental questions remain unsolved. In particular, the long-standing “final state conjecture,” which states that the final state of the universe is a set of black holes moving away from each other plus residual gravitational radiation, remains out of reach. There are aspects of the final state conjecture that remain unclear even in the simplest case, a single isolated black hole governed by Einstein’s vacuum equations (EVE). Two critical properties of isolated black hole spacetimes that are relevant for the final state conjecture are black hole rigidity and black hole stability. Motivated by pursuing a greater understanding of the final state conjecture, I am to achieve the following.

1. Advance the understanding of black hole rigidity, particularly in settings outside the asymptotically flat regime such as the setting with a positive cosmological constant. Current proofs of black hole rigidity are conditional on assumptions that are not compatible with the final state conjecture, such as conditions on the bifurcate spheres of a solution. I propose to study how to relax these conditions to have conditional rigidity results that are compatible with the final state conjecture.
2. Advance in the understanding of black hole stability by studying the behavior of wave-type equations under singular limits in general relativity, especially in physically relevant cases such as the vanishing cosmological constant, or near-extremal black hole limits. While slowly-rotating black holes have been proven to be stable in both the positive and zero cosmological constant regimes, their uniform behavior is not well understood since perturbations of Kerr only decay polynomially back to the family while perturbations of Kerr-de Sitter decay exponentially back to the family. Similarly, while both sub-extremal and extremal black holes have both been studied independently, their uniform behavior is not well understood. Thus I propose to study the uniform behavior of solutions to Einstein’s equations in these singular limits, combining techniques in microlocal and geometric analysis.
3. Further explore the coupling between gravity and other fundamental forces, such as electromagnetism via a study of solutions of the Einstein-Maxwell equations. While there is a long history of work understanding the stability of black holes in vacuum, there is comparatively less work on understanding the coupling between gravity and electromagnetism via the Einstein-Maxwell equations. By studying the stability of the Kerr-Newman family, I will further the understanding of the dynamics of charged black holes and of coupled gravity and electromagnetism more broadly.

Resumen del Currículum Vitae:

I am a postdoctoral researcher at the University of Münster. I was previously a postdoctoral research associate at Princeton University, and am a NSF postdoctoral fellow (under the Mathematical Sciences Postdoctoral Research Fellowship DMS-2303241 of 190 000 USD). I obtained my thesis on the nonlinear stability of the slowly-rotating Kerr-de Sitter family from Sorbonne Université under the supervision of Jérémie Szeftel.

My research, which has been published in prestigious journals like Annals of PDE, Comm. in Mathematical Physics, and Advances in Theoretical and Mathematical Physics, has focused on mathematical general relativity.

1. Black hole stability:

1.1 Stability of Kerr-de Sitter: I gave a novel proof of the nonlinear stability of the slowly-rotating Kerr-de Sitter family using a combination of spectral theoretic techniques and geometric analysis.

1.2 Initial data construction for the black hole stability problem and for the Minowski stability problem. I am currently working with J. Szeftel and A. Touati to extend these constructions to the case of a vanishing cosmological constant.

1.3 Stability of Kerr Newman: I constructed a GCM (general covariant modulated) framework adapted to the coupling between electromagnetism and gravity needed to analyze the stability of Kerr-Newman and proved decay rates for perturbations of Kerr-Newman along GCM hypersurfaces with E. Giorgi and J. Wan. We are in collaboration to extend these decay rates to the full spacetime.

2. The rigidity and uniqueness of Kerr-de Sitter as a stationary solution to the Einstein vacuum equations with a positive cosmological constant. I am currently working with A. Ionescu to investigate the asymptotic uniqueness of black hole spacetimes as asymptotically stationary solutions to Einstein’s equations.

3. I have worked on geometric hyperbolic partial differential equations outside of specific applications to black hole rigidity and black hole stability. I gave a gauge-independent proof of the decay rates of massive Maxwell-Klein-Gordon. I gave an explanation of the redshift effect near black holes as an example of a radial point structure.

Fellowships and Prizes

I was awarded a Mathematical Sciences Postdoctoral Research Fellowship (MSPRF) from the National Science Foundation (NSF) of the USA (190 000 USD).

International collaborations, experiences, and talks

I have ongoing projects with E. Giorgi (Columbia) and J. Wan (Sorbonne); J. Szeftel (CNRS, Sorbonne) and A. Touati (CNRS, Bordeaux); M. Apetroaie (EPFL); P. Hintz (Penn State); A. Ionescu (Princeton); and G. Holzegel (Münster). I have done short research visits at ETH Zürich (P. Hintz), EPFL (M. Apetroaie), Columbia University (E. Giorgi), the University of Melbourne (V. Schlue), and Sorbonne Université (J. Szeftel). I have been invited to talk in conferences at Guangxi University (China), Northwestern University (USA), and MATRIX Research Programs (Australia). I participated in workshops at the Erwin Schrödinger Institute (Austria) and at the SwissMAPS Research Center (Switzerland). I gave seminar talks at Columbia, Princeton, Vanderbilt,



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Rutgers, the University of Melbourne, Harvard, the Institut Fourier, the University of Bordeaux, Yale, UMass Amherst, ShanghaiTech, ETH Zurich, EPFL, the University of Leipzig, Stanford, UNC-Chapel Hill, UKentucky, Sorbonne, and at the Paris GR seminar.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: GRANDE IZQUIERDO, RICARDO
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Correo Electrónico: ricardo.grande.izquierdo@gmail.com
Título: From Wave Turbulence to Extreme Events: Probabilistic Analysis of out-of-equilibrium Hamiltonian wave systems

Resumen de la Memoria:

1. Trayectoria, Movilidad e Independencia:

Mi trayectoria académica ha sido altamente competitiva e internacional desde sus inicios, con el objetivo de adquirir las herramientas necesarias para convertirme en un líder en el campo de EDPs No Lineales y Probabilidad.

Tras mi Licenciatura en España, obtuve la Beca Europa La Caixa (2014) para completar un Máster en la U. de Cambridge (Reino Unido). Este periodo fue crucial, proporcionándome experiencia en el sistema británico al igual que mi primer contacto con la teoría cinética bajo la supervisión de C. Mouhot.

De 2015 a 2020, realicé mi Doctorado en el MIT (EE. UU.) bajo la supervisión de G. Staffilani. Esta experiencia me dio la oportunidad de aprender y dominar técnicas de EDPs dispersivas y de análisis armónico, y de adquirir una importante experiencia docente en el sistema americano.

De 2020 a 2023, obtuve una posición muy competitiva como Postdoctoral Research Associate dentro de la Simons Collaboration on Wave Turbulence, con estancias en la U. Michigan (EE. UU.) y la École Normale Supérieure (Francia). Esta movilidad estratégica me permitió trabajar codo con codo con líderes en teoría cinética y turbulencia, consolidando mis competencias en sistemas turbulentos de ondas, tanto desde el punto de vista matemático como físico.

Desde 2023, trabajo en SISSA (Italia), lo cual me ha dado acceso a la mejor institución de investigación del sistema italiano, y me ha permitido consolidar mi presencia en Europa. Mi contribución a la SISSA ha sido doble: por una parte, he incorporado mi línea de investigación sobre el análisis probabilístico de ondas anómalas al ERC Consolidator Grant de A. Maspero. Por otro lado, me he convertido en el principal experto en probabilidad y EDPs del departamento. Esto último me ha permitido colaborar con numerosos expertos y obtener financiación y subvenciones muy competitivas que apoyan mis líneas de investigación.

2. Líneas de Investigación

Mi investigación se centra en el estudio de sistemas de ondas fuera del equilibrio, abordando dos líneas complementarias desde un punto de vista estadístico: el estudio del comportamiento medio del sistema (mediante la derivación de ecuaciones cinéticas), y el estudio de las desviaciones más probables respecto a la media (estudio de fenómenos raros).

(RL1) Eventos Extremos (Ondas Anómalas): Utilizo la Teoría de Grandes Desviaciones para identificar las condiciones iniciales más probables que conducen a una onda extrema en el mar. El objetivo principal es clarificar el mecanismo de formación subyacente más probable según el modelo oceánico en cuestión (combinando técnicas de EDPs no lineales y probabilidad). Este proyecto conecta la teoría de la probabilidad, con las EDPs y la oceanografía.

(RL2) Transferencia de Energía: Investigo la transferencia de energía en sistemas de ondas turbulentas. Los objetivos son dos: (1) Explorar la convergencia a través de soluciones autosimilares a condensados de Bose-Einstein, (2) demostrar la existencia y analizar soluciones estacionarias en forma de ley de potencia (conocidas como espectros de Kolmogorov-Zakharov) para sistemas forzados estocásticamente. El enfoque matemático principal será el análisis asintótico de EDPs estocásticas, la derivación de ecuaciones cinéticas que aproximan el comportamiento medio del sistema, y el estudio de sus soluciones.

Resumen del Currículum Vitae:

1. Movilidad, Financiación y Red Internacional

Mi trayectoria académica ha sido altamente competitiva e internacional, con estancias postdoctorales y de doctorado en universidades de élite en el Reino Unido (Cambridge 2014-2015), EE. UU. (MIT 2015-20, U. Mich. 2020-21), Francia (ENS 2021-23) e Italia (SISSA 2023-Actual). Esta movilidad ha facilitado la colaboración con científicos de primer nivel en mi campo: Clément Mouhot, Gigliola Staffilani, Zaher Hani, Isabelle Gallagher, Massimiliano Berti y Alberto Maspero, entre otros.

Fui miembro activo de la Simons Collaboration on Wave Turbulence (un equipo interdisciplinar de 20 IPs en EEUU y Europa) que abordó de forma ambiciosa el sexto problema de Hilbert, al cual he contribuido con mi investigación. Actualmente soy Investigador Principal (IP) de dos proyectos financiados vinculados a mis líneas principales de investigación (con un presupuesto de 50.000€). Mis principales premios incluyen la Beca Europa La Caixa (cubre matrícula y estipendio completo del Máster en Cambridge) y el puesto Simons Postdoctoral Research Associate dentro de la Colaboración Simons.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

2. Producción Científica y Reconocimiento

He publicado 14 artículos en revistas de primer nivel en matemáticas y física, incluyendo Comm. on Pure and Applied Math., SIAM J. on Math. Analysis, Nonlinear Analysis y Phys. Rev. Research. Mi producción demuestra un alto nivel de independencia: soy autor único de tres artículos, he producido un artículo con un postdoc externo, y mi historial de publicaciones es mayoritariamente independiente de mi directora de doctorado (solo 3 de mis 14 artículos son en co-autoría con ella).

Gracias a mi trabajo he sido ponente invitado en prestigiosas conferencias internacionales (Oberwolfach, CIRM, Inst. Henri Poincaré) y seminarios en instituciones de élite en EE. UU. (NYU, Brown, MIT), Francia (Sorbonne U., ENS Lyon, E. Polytechnique) y el resto de Europa (EPFL, U. Milán, U. Bielefeld, U. Gante).

3. Liderazgo, Servicio y Docencia

Liderazgo: Organizo el seminario de EDPs y Sistemas Dinámicos en SISSA (desde 06/2023). He organizado una conferencia internacional (presupuesto de €45.000) y participo regularmente en comités de admisión de doctorado y contratación postdoctoral en SISSA.

Servicio a la Comunidad: Contribuyo activamente como revisor habitual para revistas de alto impacto como ARMA, Annals of PDE, Communications in Mathematical Physics y SIAM Journal on Mathematical Analysis. Anteriormente, participé activamente en la divulgación matemática como editor y colaborador de la revista Pikasle, y como participante en varios programas de radio.

Docencia y Supervisión: Mi experiencia incluye 250 horas de docencia en diversas instituciones internacionales (MIT, U. Michigan, SISSA), cubriendo cursos de grado (Ecuaciones Diferenciales, Cálculo, etc.) y cursos especializados de doctorado (sobre turbulencia y probabilidad para EDPs). Actualmente, co-superviso un estudiante de doctorado, he supervisado una tesis de Máster y tres proyectos de investigación de último año de grado.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: LEMOS GOMES , PHILLIPO LAPPICY
Referencia: RYC2025-056883-I
Correo Electrónico: philemos@ucm.es
Título: Dynamics of Ordinary and Partial Differential Equations and Applications
Resumen de la Memoria:

Since completing my PhD at Freie Universität Berlin, Germany, I have held postdoctoral positions in Brazil, Portugal, and Spain, and I am currently a Marie Curie Fellow at the Universidad Complutense de Madrid.

I have authored 20 scientific papers (16 in Q1 journals), 3 submitted and 1 survey note, with 5 ongoing collaborations. I have also co-developed 3 Julia packages to rigorously establish the existence, stability and continuation of periodic orbits for certain models. I have built a broad international profile, with 19 collaborators in 8 countries and 84 invited talks across 18 countries. My outreach dissemination includes contributions to El País, O Globo, and Jornal da USP, as well as interviews in major science outreach venues. I currently supervise 2 PhD students and I have supervised 9 undergraduate and master's projects.

My research interests are ordinary and partial differential equations (ODEs and PDEs), in which I use dynamical systems techniques to analyze them. Solutions of ODEs and certain PDEs are described by the temporal evolution of initial configurations within the phase-space of all configurations. Beyond classical questions of existence, uniqueness, and regularity of solutions, the dynamical systems theory seeks to comprehend the qualitative structure: what is the behaviour of all solutions as time evolves?

In both ODEs and PDEs scenarios, under certain growth hypotheses, there is a non-empty compact set that attracts all solutions, called the global attractor. Essentially, all solutions converge to this attractor as time goes to infinity, and thus the attractor describes the long-term asymptotics of a given model. My research goals revolve around describing the structure of the global attractors for specific ODEs and PDEs.

I have three research directions as regards the structure of certain global attractors. First, I explore the dynamics of general parabolic PDEs, with an application to the theory of Ginzburg-Landau equations. Second, I examine the ODEs responsible for inducing biodiverse oscillatory behavior in ecosystems with competing predators. Third, I address the ODEs which should describe the chaotic regime of the Big Bang, known as the Belinski-Khalatnikov-Lifshitz (BKL) conjecture from 1970. I emphasize that recently, I'm employing computer-assisted proofs to obtain rigorous results for some of these problems.

Resumen del Currículum Vitae:

I earned a Bachelor of Science degree in Mathematics at the Universidade de Brasília, Brazil, in 2010. Afterwards, I completed my PhD in 2017 at Freie Universität Berlin, Germany, within the framework of the Berlin Mathematical School supervised by Bernold Fiedler. Thereafter, I have secured several postdocs positions at Universidade de São Paulo, Brazil, Instituto Superior Técnico de Lisboa, Portugal, and Universidade Federal do Rio de Janeiro, Brazil. Currently, I am a Marie Curie Fellow at Universidad Complutense de Madrid.

Scientific Contributions

I use dynamical systems techniques to analyze ordinary and partial differential equations (i.e. ODEs and PDEs) with applications in physics and biology. I have three research directions. Firstly, I analyze the asymptotics of general parabolic PDEs, such as the construction of global attractors or blow-up behavior. Secondly, I examine an ODE model with co-existent biodiverse regimes (e.g. periodic orbits) in predator-prey models, and prove their stability and bifurcations. Third, I am interested in an ODE model that should describe the chaotic aspects of the Big Bang, a conjecture still open from 1970 by Belinski, Khalatnikov, Lifshitz (BKL). Recently, I employ computer-assisted methods to obtain rigorous proofs.

I authored 20 scientific papers: 16 published in specialized journals (most in Q1 journals), 3 submitted and 1 survey notes; I have further 5 ongoing collaborations. I comply with (green) open access standards and my research is freely available at arxiv.com.

Mobility and Internacionalisation

I have 19 collaborators working in 8 countries. I presented my research at 42 conferences and I've additionally been invited to speak at 42 internal university seminars yielding a total of 84 invited talks across 18 countries. In addition to the 10 distinguished talks at conferences listed below, I was invited to present seminars at Imperial College London, Weierstrass Institut, Ecole Polytechnique de Paris, McGill University, Steklov Institute, among others. For several of these talks, I spent a longer period visiting some researchers.

Contributions to Society and the Private Sector

I authored 3 outreach papers for the general public in major media outlets (El País, O Globo, and Jornal da USP). I was interviewed by the Museum of Art and Science (SESI-Lab) in Brazil and by the Spanish podcast El Rompeolas, broadcast on Onda Regional de Murcia. Both interviews are available online. Representing the BMS, I gave a public lecture at the International Congress of Mathematicians (ICM 2018) and I participated in a round table



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

on research opportunities in Germany at the Goethe Institut São Paulo. Finally, my latest paper is co-authored with a former student now at Google, a collaboration I intend to strengthen.

Training and Mentoring

Currently, I co-supervise 2 PhD students: V.D. Sanchez (with R. Pardo at Universidad Complutense de Madrid) and E. Beatriz (with E. Bonotto at Universidade de Sao Paulo, Brazil). I supervised 6 undergraduate and 3 masters research projects and thesis in Brazil, Germany and Spain. This collaboration produced 3 published papers in renowned journals (e.g. Mathematische Annalen) and 1 submitted paper. I taught 11 courses (3 graduate, 3 undergraduate; 5 as teacher assistant) in Brazil and Spain.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: LAMAISON VIDARTE, ANDER
Referencia: RYC2025-056613-I
Correo Electrónico: alamaisonv@gmail.com
Título: Reduction methods for extremal problems on hypergraphs

Resumen de la Memoria:

My area of research is extremal combinatorics, particularly Ramsey Theory and Turán problems. In addition to a number of standalone contributions, there are two main threads in my research: the Ramsey upper density of infinite graphs, and the uniform Turán density of hypergraphs.

I have a publication record consisting of 14 published papers, 1 accepted to a journal, and 7 submitted papers. A list of these can be found on my CV. Some of the journals in which my research has been published are the Journal of the London Mathematical Society, Israel Journal of Mathematics, Advances in Combinatorics and Journal of Combinatorial Theory, Series B.

The main goal of my research is to study the behavior of problems in extremal combinatorics, with a special focus in Turán-type questions, in a way that goes beyond finding the exact solutions or improving the bounds for individual quantitative problems. The two threads that I will explore are as follows:

1. Reducing the search space in extremal problems. In Turán-type questions, the class $\mathcal{C}$ of all discrete structures (e.g. the class of all graphs or hypergraphs) can be very complex and difficult to analyze. The goal of this project is to develop methods to restrict the search to a simpler class $\mathcal{C}'$ within $\mathcal{C}$ (e.g. the class of all complete multipartite graphs) such that the solution to the extremal problem in the class $\mathcal{C}'$ is the same as in the class $\mathcal{C}$, with the aim of transforming the original problem into an easier one.

2. Analyzing the structure of the solution space in Turán problems. On graphs and hypergraphs, it is possible to normalize the basic Turán question for each structure F so that the answer is a real number $\pi(F)$ on the interval $[0,1]$, called the Turán density. Frankl and Rödl, answering a question of Erdős, initiated the study of the set of values that the Turán density can have. The structure of this set is relevant for its algorithmic applications, where gaps in the set correlate with procedures to determine or bound Turán densities.

Resumen del Currículum Vitae:

I currently hold a Postdoctoral Research Associate position at the Institute for Basic Science in Daejeon, South Korea. Previously I was a postdoc at Masaryk University in Brno, Czech Republic, and before that I was a student at Freie Universität Berlin, where I obtained my PhD under the supervision of Prof. Tibor Szabó. My research specializes in extremal combinatorics, particularly Turán problems and Ramsey theory, with a focus on the Turán density of hypergraphs and related parameters.

My publication record consists of 14 published, 1 accepted and 7 submitted papers. The published papers have appeared in prestigious journals including the Journal of the London Mathematical Society, Israel Journal of Mathematics, Advances in Combinatorics and Journal of Combinatorial Theory, Series B. I have presented my research at conferences such as the European Congress of Mathematicians, EUROCOMB, the British Combinatorial Conference, the RSME Congress for Young Researchers, and two Oberwolfach workshops. I have also given talks at seminars such as the Princeton Discrete Math Seminar, the Rényi Institute Combinatorics Seminar, and Czech Academy of Sciences Graph Theory Seminar. I have made research visits to professors and research groups at institutions such as Princeton University, the University of Illinois in Urbana-Champaign, the Instituto de Matemática Pura e Aplicada in Rio de Janeiro, and the National University of Singapore.

I currently co-supervise a PhD student, and I supervise the Bachelor's programme final project (TFG) of another student. I am involved with mathematical olympiads at all levels, being a member of the Olympiad Commission of the Spanish Royal Mathematical Society. I have coached participants for 15 years for local, national and international olympiads, and I have been a coordinator in two editions of the International Mathematical Olympiad.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: RIBEIRO DE RESENDE ALVES, MARCELO
Referencia: RYC2025-055044-I
Correo Electrónico: marcelorralves@gmail.com
Título: Dynamics and Topology from a Symplectic Perspective: Entropy, Surfaces of Section, and Floer-Theoretic Invariants

Resumen de la Memoria:

My research lies at the intersection of contact and symplectic topology, dynamical systems, and geometric dynamics. I study how topological invariants, especially those arising from Floer theory and contact topology, compel or force the complexity of flows such as Reeb flows and geodesic flows. A central theme of my work is showing that chaotic behaviour (positive entropy, abundance of periodic orbits) is often an intrinsic consequence of the underlying geometry or topology.

My early contributions focused on contact homology and its dynamical implications. In my doctoral work I studied the cylindrical contact homology of contact 3-manifolds and introduced the notion of exponential homotopical growth of this invariant. I proved that whenever this growth condition holds, every Reeb flow on the manifold must have positive topological entropy, yielding new mechanisms to detect chaotic dynamics via topological information. This allowed me to produce broad classes of contact manifolds in which all Reeb flows display chaotic dynamics. Simultaneously, I applied this philosophy to Legendrian contact homology,

I then broadened these methods and, jointly with collaborators (Dahinden, Meiwes and Pirnapasov), developed forcing results for topological entropy in dimension three. These results show that the existence of links of periodic orbits with certain topological properties for a Reeb flow compel it to have positive entropy, effectively encoding a part of the dynamical complexity into link data and contact topology. In higher dimensions, in a joint work with Matthias Meiwes, we constructed examples of dynamically exotic contact spheres on which every Reeb flow has positive entropy. This work established a higher-dimensional analogue of the homology-to-entropy principle through algebraic growth of wrapped Floer homology.

The technology developed in these works, combined with new insights led to the discovery of new dynamical rigidity phenomenon for geodesic flows and Reeb flows. In the context of geodesic flows, I obtained, together with my collaborators, C0-stability results for entropy under small perturbations of the Riemannian metric, showing that certain geodesic configurations that enforce positive entropy persist for all C0-close metrics. This result is unexpected because geodesic flows are very sensitive to C0-small perturbations of the metric: the geodesic equation depends on first derivatives of the metric, so even small C0 changes can dramatically change the dynamics of the geodesic flow.

More recently, we applied this forcing theory to obtain new results for a classical class of dynamical systems: geodesic flows on closed Riemannian surfaces. In collaboration with Marco Mazzucchelli, we used this dynamical forcing and the curve-shortening flow to establish the existence of Birkhoff sections for the geodesic flow of any closed orientable surface. Birkhoff sections reduce the study of a 3-dimensional flow to that of a surface diffeomorphism, thus making it possible to apply the powerful methods of surface dynamics to study its dynamical properties.

Across all these lines of work, my trajectory is unified by the goal of understanding how topology and geometry shape dynamical behaviour. I combine modern contact and symplectic techniques with classical dynamical tools to address both longstanding and new dynamical questions.

Resumen del Currículum Vitae:

I began my Ph.D. in October 2011 at the ULB (Belgium) under Professors Frédéric Bourgeois and Chris Wendl. My Ph.D. work led to two theses (ULB and Université Paris-Saclay). After completing my doctorate at Université Paris-Saclay, I held a postdoctoral position at Université de Neuchâtel (Switzerland) with Professor Felix Schlenk, followed by a postdoctoral appointment at Ruhr-University Bochum (2017-2018), in the group led by Professor Alberto Abbondandolo. I returned to ULB as a postdoctoral researcher (2018-2020), working with Professor Joel Fine. Between November 2020 and October 2024, I was an FWO Senior Postdoctoral Fellow at the University of Antwerp (Belgium), hosted by Professor Sonja Hohloch. From October 2024 to September 2025, I held a fixed-term lecturer position (suppléant de cours) at ULB. I am currently a Postdoctoral researcher in the Institute of Mathematics at the University of Augsburg in the group led by Professors Kai Cieliebak and Urs Frauenfelder.

During my career I have built an extensive network of collaborators, which includes the following researchers: Abror Pirnapasov (currently at IAS Princeton), Matthias Meiwes (currently at Tel Aviv University), Alberto Abbondandolo (Bochum), Felix Schlenk (Neuchâtel), Vincent Colin (Nantes), Lucas Dahinden (Utrecht), Umberto Hryniewicz (RWTH Aachen), and Marco Mazzucchelli (IMJPRG Paris).

My research output so far includes 11 published or accepted articles, and 2 articles which are currently being written. I have given 10 Conference Talks, and more than 25 seminar talks in different countries in Europe, South America and Asia.

In my career I obtained two prestigious postdoctoral grants:



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

- An Ambizione grant from the Swiss National Foundation, that I decided to decline.
- An FWO Senior Postdoctoral grant from the FWO (Research Foundation Flanders), which lasted from November 2020 to October 2024.

The main theme of my research is the relationship between contact and symplectic topology and the dynamical properties of Hamiltonian dynamical systems. In many of my works, I applied methods from symplectic topology to investigate new aspects of the dynamical complexity of Hamiltonian diffeomorphisms, Reeb flows and geodesic flows. One dynamical invariant that appears preeminently in my work is the topological entropy, which codifies in a single non-negative number the exponential complexity of a dynamical system. More recently, I have used methods and insights obtained from these investigations to attack a different problem: the construction of Birkhoff sections of geodesic flows. Some of my main contributions are contained in the following articles:

- "Cylindrical contact homology and topological entropy" (published in the journal *Geometry & Topology*),
- "CO-stability of topological entropy for Reeb flows in dimension 3" (joint with Abror Pirnapasov, Lucas Dahinden and Matthias Meiwes and accepted for publication in the *Journal of the European Mathematical Society*),
- "From curve shortening to flat link stability and Birkhoff sections of geodesic flows" (joint with Marco Mazzucchelli and published in the *Journal de l'École Polytechnique - Mathématiques*).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: HUGHES, SAM
Referencia: RYC2025-054500-I
Correo Electrónico: sam.hughes.maths@gmail.com
Título: Profinite and homological methods in group theory
Resumen de la Memoria:

I am a Humboldt fellow at University Bonn. Before that I was a postdoctoral research associate in the Mathematical Institute at the University of Oxford working as part of Professor Dawid Kielak's team. Before that (2018-2021), I was an EPSRC funded PhD student at the University of Southampton under the supervision of Professor Ian Leary. Even before that (2014-2018), I completed an MMath degree at the University of South Wales. Originally I am from Wales.

A recurring theme in my work is that homological methods provide a powerful and versatile framework for resolving long-standing problems across geometry, topology, and group theory.

A classical problem in complex algebraic geometry formulated by Grothendieck is how much information do the finite quotients of fundamental groups of complex projective varieties retain, and in particular, if they can recognize the group completely. In joint work with Llosa, Py, Stover, and Vidussi we advanced this problem by showing a number of quite staggering results including strong rigidity theorems for products of Riemann surfaces.

Grothendieck's question naturally extends to all residually finite groups and became nowadays a central question to study. We say a group is residually finite if every non-trivial element of the group remains non-trivial in some finite quotient. In this setting, one asks whether a finitely generated residually finite group is uniquely determined (amongst the class of finitely generated residually finite groups) by its set of finite quotients. These questions turn out to be remarkably subtle and are related to deep work in the theory of profinite groups, representation theory, algebraic and geometric topology, and more recently geometric group theory.

If a finitely generated residually finite group is uniquely determined by its finite quotients, then we say it is absolutely profinitely rigid. Determining absolute profinite rigidity is an extremely difficult task (in fact it is often false [Bridson–Grunewald, Ann. Math. 2004]) and there are very few examples of such groups (see for example the ground breaking work of Bridson, McReynolds, Reid, and Spitler [Ann. Math. 2020]). Even in situations where there is a rich geometry to draw from, there are many deep difficult open problems.

Homological ideas also play a central role in my work in 4-manifold topology. A highlight of my career is the result obtained with Prof. Danny Ruberman, where we resolve a problem of Kronheimer from 1993 (also asked in a paper which won the 2023 AMS Leroy P. Steele Prize and is in the well-known 1997 Kirby's problem list on 4-manifold topology).

Beyond these geometric applications, I have investigated homological invariants in analytic and algebraic contexts, contributing to the understanding of torsion growth in the sense of Bergeron and to the interface between group homology, functional analysis (L^2 homology, Baum–Connes Conjecture) or algebraic K-theory (Farrell–Jones Conjecture).

Resumen del Currículum Vitae:

I am currently an Alexander von Humboldt fellow at the Universität Bonn. I completed my MMath degree at the University of South Wales (2018) where I was awarded the project prize and my EPSRC funded PhD at the University of Southampton (2021), where my thesis received special mention for the international Baer prize (2022). I held a postdoctoral research position at the University of Oxford (2021-2024).

My research interests are in the interactions of geometric group theory, algebraic topology, algebraic geometry, and low-dimensional topology, often viewed through the lens of group cohomology. My research has been featured in the popular science magazines Quanta (American) and Epsilon (French) and in Dawid Kielak's ICM address. I have received research grants from the London Mathematical Society, the Clay Mathematics Institute, the Alexander von Humboldt Foundation, and the Heilbronn Institute. I have 21 papers accepted in indexed journals internationally recognised journals (including top journals such as Proc. Lond. Math. Soc., Math. Ann., Comment. Math. Helv., Sel. Math. New Ser., and Rev. Mat. Iberoam.). I have also written two accepted survey papers and a further 10 preprints. A highlight of my career is a result obtained with Prof. Danny Ruberman, where we resolve a problem of Kronheimer from 1993 (also asked in a paper which won the 2023 AMS Leroy P. Steele Prize and is in the well-known 1997 Kirby's problem list on 4-manifold topology).

I have endeavoured to make my research publicly available, to this end I post all of my papers and preprints to the preprint server arXiv and to my personal website. I have also communicated my work extensively, have given over 27 invited seminar talks, 9 invited conference talks, and I gave a mini-course in Bilbao. The talks have been at a number of prestigious institutions such as KIT in Karlsruhe, MPIM in Bonn, the University of Cambridge, Columbia University in New York, the ICMAT in Madrid, and CRM in Montréal.

I have organised three international conferences and I am an organiser of a junior research retreat to be hosted near Bonn. I founded a research network and seminar series "Groups & Geometry in North Rhine Westphalia" in Germany. At Southampton, I organised a multidisciplinary seminar "Maths & Mingle" which featured in the LMS newsletter and provided both soft skills training for graduate students as well as an EDI forum. At Oxford, I co-organised a similar seminar "Fridays at 4" and at Bonn I organized our "Geometric Group Theory Oberseminar".



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I am passionate about disseminating science more broadly. For example I have been featured in Quanta magazine and have been interviewed by the French language popular science magazine Epsilon. Alongside this I am volunteer editor at Chalkdust Magazine, a mathematical periodical aimed at secondary school students. I organised a multidisciplinary seminar 'Maths & Mingle' which featured in the LMS newsletter.

In 2024 I supervised the masters theses of 3 MMath students, 1 OMMS MSc student (who won the project prize), and 1 MFoCS MSc student. Four of the five students achieved a top grade of 1st class (above 70) and three of them scored marks above 85 (an exceptional mark). I also supervised four undergraduate summer projects. I now supervise 1 MSc student at Bonn.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas

Nombre: GIMENO, JOAN

Referencia: RYC2025-054885-I

Correo Electrónico: joan@maia.ub.es

Título: N/A

Resumen de la Memoria:

My research trajectory spans the intersection of rigorous mathematical theory, numerical methods, and applications in dynamical systems. It is structured around three complementary pillars: (1) functional differential equations and perturbation theory, (2) jet transport and high-order variational analysis, and (3) KAM theory and conformally symplectic systems, particularly in Celestial Mechanics.

I began my career studying functional and delay differential equations (DDEs, FDEs), developing new analytical and numerical tools to understand the qualitative behavior of solutions with memory effects. I contributed to the theoretical and computational treatment of bifurcations in models with time lags and autocatalytic dynamics. Later, I co-developed a perturbative framework for singular functional differential equations, providing a-posteriori existence and uniqueness theorems for periodic orbits and isochrons. These results led to computer-assisted proofs and extensions to state-dependent delays and history-dependent perturbations.

In parallel, I advanced the theory and implementation of jet transport—a method that uses multivariate polynomials to propagate uncertainty and variational flow in ODE solvers. I showed that jet transport naturally recovers the flow of high-order variational equations, and applied this insight to compute invariant manifolds and high-dimensional tori via the parametrization method. I also led the development of Taylor2, a publicly available numerical package featuring jet transport, parallelization, and support for high-precision arithmetic.

During my postdoctoral stage, I focused on conformally symplectic systems, applying KAM theory to the study of quasi-periodic attractors and breakdown phenomena. I analyzed the spin-orbit and spin-spin-orbit models from Celestial Mechanics, combining rigorous validation, high-precision numerics, and renormalization techniques. In particular, I identified mixed breakdown mechanisms and uncovered scaling behaviors that deviate from standard universality classes—opening new questions in renormalization theory.

My work is characterized by a strong combination of theoretical development, algorithm design, and numerical experimentation. I have published in reputable journals, served as corresponding author in several papers, and disseminated my results in over 15 international conferences. I am PI or co-PI in different competitive research projects and supervise MSc and PhD students. My international experience includes long-term stays in Japan, Italy, Canada, and the USA.

Resumen del Currículum Vitae:

My research activity focuses on the interplay between dynamical systems, differential equations, and numerical analysis, with particular emphasis on time-dependent and history-based models, as well as the geometric structures that govern their long-term dynamics. I have contributed to the theoretical and numerical analysis of functional and differential equations—both ordinary (ODEs) and with memory effects—developing robust tools for computing and validating recurrent behaviors such as periodic orbits and high-dimensional invariant tori.

Throughout my career, I have introduced original perturbative methods for singular functional equations, combined with computer-assisted proofs (CAPs), to ensure the existence and regularity of solutions in infinite-dimensional settings. In parallel, I explored the potential of jet transport—a technique using multivariate polynomials for uncertainty propagation—to compute variational flows and geometric objects like invariant manifolds. This led to the development of the open-source Taylor2 package, now used for high-order integration and validated computation in various contexts.

During my postdoctoral work, I have specialized in conformally symplectic systems, applying KAM theory to analyze the persistence and breakdown of quasi-periodic attractors in problems from Celestial Mechanics, such as the dissipative spin-orbit and spin-spin models. These works revealed novel breakdown mechanisms and scaling phenomena, challenging existing universality expectations. I have also developed high-precision parallel algorithms to compute invariant objects and collaborated with applied groups to study planetary dynamics and mission design.

My research outputs include over 15 journal publications—many as corresponding author—plus open-source software, 5 research grants (4 as PI), and more than 15 invited talks. I have been awarded national and international fellowships, including "la Caixa" Junior Leader and Marie Skłodowska-Curie programs, and completed extended stays at institutions in Japan, Italy, Canada, and the USA, which enhanced my scientific network and collaborative impact.

I have actively mentored MSc and PhD students, participated in international seminars and reading groups, and served as thesis committee president. Beyond research, I have engaged in outreach activities and co-organized scientific sessions. My work contributes both to foundational mathematics and to applications in astrodynamics, biology, and engineering systems through reproducible, rigorous, and computationally efficient methods.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias matemáticas
Nombre: REMBADO, GABRIELE
Referencia: RYC2025-055013-I
Correo Electrónico: gabriele.rembado@upc.edu
Título: Deformations & quantizations of moduli spaces: flat connections, representation theory, and Poisson geometry

Resumen de la Memoria:

I will develop a general theory of quantum isomonodromic deformations, constructing vector bundles of irregular nonabelian theta-functions and conformal blocks from quantized moduli spaces of irregular-singular connections; by combining and relating geometric and deformation quantization. This will lead to quantum actions of generalized braid groups and Mapping Class Groups (MCGs), with applications to complex Poisson geometry, representation theory, Lie theory, and low-dimensional topology.

Recall that moduli spaces of holomorphic connections on Riemann surfaces are identified with (hyperkähler) complex character varieties, which assemble into flat bundles when the base surface is deformed. Their monodromy yields symplectic actions of MCGs.

Moreover, compact character subvarieties serve as phase-spaces in Hamiltonian mechanics, and admit geometric quantization by spaces of nonabelian theta-functions: remarkably, these spaces themselves form flat (projective) bundles, and the resulting (projective) quantum actions of MCGs famously underpin 3-manifold and knot invariants.

A profound generalization of this story emerges for meromorphic connections. Even in the regular-singular (Fuchsian) case, braiding the position of the simple poles while keeping monodromy fixed produces flat Poisson bundles of character varieties, whose symplectic leaves depend on residue orbits. In the semisimple case these leaves are deformation-quantized by spaces of conformal blocks, and in genus zero the semiclassical limit recovers the isomonodromic deformation equations. The corresponding quantum representations encode the Kohno–Drinfeld theorem for quantum groups.

Nonabelian theta-functions and conformal blocks have since been related, and this project extends this framework to moduli spaces of irregular-singular connections (with higher-order poles), completing the study of their deformations & quantizations.

Indeed, beginning with my PhD I extended the quantum Fuchsian examples to new irregular-singular cases. In subsequent work with collaborators I also constructed spaces of irregular conformal blocks and used them to deformation-quantize the corresponding symplectic leaves of moduli spaces; this leads to new quantum actions of braid groups, which remain to be explicitly computed.

However, many quantum-topological phenomena are yet to be explored. Notably, together with other collaborators I have just concluded the topological study of the isomonodromic deformation parameters, finally covering the general twisted setup of two-dimensional meromorphic gauge theory. The result is a construction of ‘cabled’ generalizations of braid groups and ‘wild’ generalizations of MCGs. I now propose to use the new topological input as a precise guide to develop the quantum theory much further, by: (i) finding explicit presentations of the new ‘wild’ mapping class groups, computing their Poisson/symplectic actions on twisted ‘wild’ character varieties; (ii) quantizing more general examples, possibly geometrically, with applications in geometric representation theory; (iii) computing the monodromy/Stokes data of the new flat (projective) quantum connections, generalizing the prototypes in conformal/topological quantum field theory; (iv) further directions, detailed in the ‘Memoria’.

Resumen del Currículum Vitae:

1 EMPLOYMENT

2026-2031: Lector, UPC (Barcelona)
2023-2026: Marie Curie Fellow, Uni.Montpellier & Maryland
2020-2023: Postdoc, Uni.Bonn
2019-2020: Postdoc, Uni.Geneva
2018-2019: Postdoc, ETH Zurich
2017-2018: ATER, Uni.Paris-Saclay

2 EDUCATION

2024-2018: PhD, Uni.Paris-Saclay & QGM Aarhus
2012-2014: MSc, Uni.Paris VI & ENS Paris
2009-2012: BSc, Uni.Bologna & Coll.Sup.Bologna

3 FUNDING

Working team, Min.Cien.Inn.Uni. grant PID2024-155686NB-I00
Marie Curie fellowship, Eur.Comm. grant 101108575
Collaborator, Acad.Finl. grant 340461
Co-PI, Swiss Nat.Sci.Found. grant 178794
Co-PI, Jap.Soc.Prom.Sci. grant 15K17552

4 SCIENTIFIC PRODUCTION

4.1 PUBLISHED/ACCEPTED

Local wild mapping class groups and cabled braids (w/ J. Douçot, M. Tamiozzo)
Ann.Inst.Fourier (in press)



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Twisted local wild mapping class groups: configuration spaces, fission trees and complex braids (w/ P. Boalch, J. Douçot)
PRIMS (2025)

Topology of irregular isomonodromy times on a fixed pointed curve (w/ J. Douçot)
Transf.Groups (2025)

Sp(1)-symmetric hyperkähler quantisation (w/ J.E. Andersen, A. Malusà)
Pacific J.Math. (2024)

A colourful classification of (quasi) root systems and hyperplane arrangements
J.Lie Theory (2024)

Singular modules for affine Lie algebras, and applications to irregular WZNW conformal blocks (w/ G. Felder)
Selecta Math. (2023)

Genus-one complex quantum Chern-Simons theory (w/ J.E. Andersen, A. Malusà)
J.Simpl.Geom. (2022)

Symmetries of the simply-laced quantum connections, and quantisation of quiver varieties
SIGMA (2020)

Simply-laced quantum connections generalising KZ
Comm.Math.Phys. (2019)

4.2 PREPRINTS

Wild genus-zero quantum de Rham spaces (w/ M.Chaffe, D. Yamakawa)
arXiv:2510.17666

Twisted local G-wild mapping class groups (w/ J. Douçot, D. Yamakawa)
arXiv:2504.01701

Moduli spaces of untwisted wild Riemann surfaces (w/ J. Douçot, M. Tamiozzo)
arXiv:2403.18505

Wild orbits and generalised singularity modules: stratifications and quantisation (w/ D. Calaque, G. Felder, R. Wentworth)
arXiv:2402.03278

5 TEACHING

5.1 SUPERVISION

2022: K. Yasaka, MSc Uni. Bonn

2021: S. Maibach, ibid.

2019: T. Spirig, BSc ETH Zurich

5.2 UNI. COURSES

2020-2021: MSc Uni.Bonn

2019-2020: BSc Uni.Geneva

2018-2019: MSc ETH Zurich

2014-2018: BSc Uni.Paris-Saclay

6 INVITATIONS/COMMUNICATION (PAST 5 YEARS)

6.1 TALKS @ CONFERENCES/WORKSHOPS

2025

Hitchin-Ngo Lab. (ICMAT)

ALPE (Uni.Barcelona)

Poisson meeting (Uni.La Rochelle)

Painlevé eq., Teichmüller theory, quantization (UPC Barcelona)

2024

Quantization in rep.theory, derived alg.geom., gauge theory (SwissMAP res.stat.)

2023

Mod.spaces of vector bundles & curves (Uni.Cergy-Pontoise)



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Journées GAGC (Uni.Poitiers)
Quantisation of mod.spaces (SwissMAP res.stat.)
The Stokes phenomenon & applications in math.phys. (SCGP)
2022
Mod.spaces & integr.systems (Uni.Genoa)
CFT & probability (Agay les Roches Rouges)
TR 2022 (Otranto)
Quantum fields & probability (Mittag-Leffler Inst.)
Quantum geometry (IHES)
Vert.algebras & Poisson geom. (SwissMAP res.stat.)
2021
GEOQUANT 2021 (Uni.Freiburg)
ICMP (Uni.Geneva)
JrQFT (Online)
VBAC (Online)

6.2 TALKS @ SEMINARS
2025
Purdue, Northeastern, Poitiers, Southern Brittany.
2024
UPC Barcelona, Clermont Auvergne, Padova, Northeastern, SISSA
2023
Montpellier, Paris-Saclay, Angers
2022
MPIM, Institut Math.Jussieu, Lyon
2021
Aalto, Toronto, Montpellier, Angers, Lyon



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: ALVAREZ LEON, LUIS
Referencia: RYC2025-054322-I
Correo Electrónico: lfalvarezleon@gmail.com
Título: Geographies of digital capitalism
Resumen de la Memoria:

I am a human geographer currently serving as Associate Professor of Geography (with tenure) at Dartmouth College. My research examines how new technologies interact with geographic processes like urbanization, trade, transportation, and geopolitical relations, among others. I have methodological and substantive interests in the digital economy with a focus on geospatial media, data, and technologies. Among other qualitative, quantitative, and computational methods, I use and study Geographic Information Systems (GIS) to study the political economic, regulatory, technological, and spatial dimensions of digital economies under capitalism. My work explains how mapping and navigation interfaces, satellite imagery, geolocation, and other geospatial technologies enable diverse forms of valuation and market construction in digital environments. Motivating this agenda is the need to understand how digital technologies influence the spatial dimensions of human experience. To date my academic production has resulted in 1 single-authored peer-reviewed monograph published with University of California Press, 28 peer-reviewed journal articles, 11 book chapters, 1 white paper, and 5 manuscripts under review (841 citations, h-index of 17, i-10 index of 22 on Google Scholar). For this work I was recently awarded the Karen E. Wetterhahn Memorial Award for Distinguished Creative or Scholarly Achievement by Dartmouth College and I was invited to join the United Nations Commission on Science and Technology for Development's Multi-stakeholder Working Group on Data Governance at All Levels as one of 7 representatives of Academia worldwide.

My research sheds light on the spatial dimensions of some of the technological, economic, and political shifts shaping our world. For instance, I have spent over a decade examining the transformation of the world economy wrought by digital technologies through reconfigurations of place, space, social relations, and power dynamics across sites and scales. This ranges from the studying the construction of a Single Digital Market in the EU, to new configurations of urban life (through the framework of the Digital Growth Machine, which I co-developed), the cross-scalar political, regulatory and ethical challenges of new automated systems (e.g., Autonomous Vehicles), the geopolitics of a new satellite ecosystem in a reignited space race, and new forms of automated and platform-based mobility, to name a few.

Through my research I show how place, space, location, and geography profoundly shape seemingly intangible digital products, services, platforms, markets, and infrastructures underpinning the spatial construction of digital capitalism. These arguments are most comprehensively developed through the theoretical framework of location, valuation, marketization in my monograph "The Map in the Machine: Charting the Spatial Architecture of Digital Capitalism" (University of California Press, 2024). My three core research programs are 1) Spatial Transformations in Digital Capitalism, 2) Political economy of geospatial data, media, and technologies, and 3) Automation, Digitization, and Mobilities.

Resumen del Currículum Vitae:

I am a human geographer currently serving as Associate Professor of Geography (with tenure) at Dartmouth College. My research examines how new technologies interact with geographic processes. I have methodological and substantive interests in the digital economy with a focus on geospatial media, data, and technologies. Among other qualitative, quantitative, and computational methods, I use and study Geographic Information Systems (GIS) to study the political economic, regulatory, technological, and spatial dimensions of digital economies under capitalism. My work explains how mapping and navigation interfaces, satellite imagery, geolocation, and other geospatial technologies enable diverse forms of valuation and market construction in digital environments. Motivating this agenda is the need to understand how digital technologies influence the spatial dimensions of human experience.

My research explains how the spatial intersections of technological, economic, cultural, and political forces underlie key global shifts underway. I have spent over a decade examining the transformation of the world economy wrought by digital technologies through reconfigurations of place, space, social relations, and power dynamics across sites and scales. This ranges from the studying the construction of a Single Digital Market in the EU, to new configurations of urban life (through the framework of the Digital Growth Machine, which I co-developed), the cross-scalar political, regulatory and ethical challenges of new automated systems (e.g., Autonomous Vehicles), the geopolitics of a new satellite ecosystem in a reignited space race, and new forms of automated and platform-based mobility, to name a few. My work shows how place, space, location, and geography profoundly shape seemingly intangible digital products, services, platforms, markets, and infrastructures underpinning the spatial construction of digital capitalism. My work provides a more detailed understanding of how, far from being made of weightless information flows, or residing in the cloud, digital capitalism is deeply rooted in place, mediated by geography, embedded in multiple spatial scales, and susceptible to more democratic forms of governance and regulation.

My first monograph "The Map in the Machine: Charting the Spatial Architecture of Digital Capitalism" (University of California Press, 2024) shows how geospatial technologies underpin the construction of digital capitalism. In addition to this book, to date I have published 28 peer-reviewed journal articles, 11 book chapters, 1 white paper, and 5 manuscripts under review (841 citations, h-index of 17, i-10 index of 22 on Google Scholar). I am a leader in the subfield of digital geographies, having built bridges to critical data studies, political and economic geography, critical GIS, cartography, and the nascent subfield of critical remote sensing. I have received numerous prestigious awards, such as a Fulbright Fellowship, and the Karen E. Wetterhahn Memorial Award for Distinguished Creative or Scholarly Achievement by Dartmouth College. I have been invited to speak at dozens of institutions in the United States, Canada, Germany, the UK, and Singapore, among others. The policy impact of my work has been globally acknowledged, and I have been invited to join the United Nations Working Group on Data Governance at All Levels.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Ciencias sociales

Nombre:

RUIZ GUARIN , NELSON ALEJANDRO

Referencia:

RYC2025-056482-I

Correo Electrónico:

nel.ruizg@gmail.com

Título:

Democracia capturada: cómo el dinero en la política impacta las políticas públicas

Resumen de la Memoria:

My research is in political economy, with a focus on the role of money in politics and how policies can curb or amplify its influence. My research uses causal inference methods and data science tools. Money in politics is a key topic of research for understanding democratic accountability and public policy delivery, since politicians may be responsive to private interests rather than those of the general electorate. In my research, I have shown how money in politics can lead to the over-representation of private interests, State capture, and worse public policy. For example, my existing work has shown that campaign donations can buy access to benefits in the form of preferential contracting (which suffers from overcosts and overruns) and has led to more deforestation.

My research has led me to examine the interplay between money in politics, the environment a largely unexplored area of research. In "Buying a Blind Eye" I have studied a novel use of campaign contributions: buying reductions in regulatory enforcement. Specifically, I argue that in return for campaign contributions, politicians who rely on donor-funding choose not to enforce sanctions against illegal deforestation activities. Using detailed satellite images, I show that deforestation is significantly higher in municipalities that elect donor-funded as opposed to self-funded politicians. This is a novel finding that links campaign contributions to deforestation and, potentially, to climate change. In "Not Every Cloud has a Silver Lining", I study the impact of natural hazards on campaign donations. Evidence indicates that after natural hazards, there are more campaign contributions, driven by higher government transfers and the use of decrees that allow more discretion in public procurement. This research points out that regulating policy responses to natural disasters is essential to prevent further state capture by moneyed interests. Although I haven't taught courses on climate change or the environment, given my research agenda I am able to teach such courses if necessary.

My work speaks directly to debates on the regulation of money in politics, public procurement, and transparency. I build large administrative datasets that link campaign donations, procurement contracts, and disciplinary investigations, and make them and their replication files publicly available. I have presented my research to central banks, development banks, ministries, and international organizations (for example CAF Development Bank, and the UK FCDO), and I have advised them on the design and evaluation of campaign finance regulation. My research has also been featured in the Washington Post, Bloomberg, BBC, El Espectador, and other media outlets. My research has also generated interest from funders; I have received funding from the CAF-Development Bank, Tinker Foundation, the Leverhulme Trust, Stanford University Center for Latin American Studies, and Oxford's John Fell Fund.

All of my research has appeared in top journals of the Political Science Discipline (American Journal of Political Science, American Political Science Review, Journal of Politics, British Journal of Political Science, and Political Analysis).

Resumen del Currículum Vitae:

Thank you for considering my application. I am a Senior Lecturer (Associate Professor), Head of the Political Economy Research Division in the Government Department at the University of Essex, and Senior Visiting Fellow at the LSE Government Department. I hold a PhD from the London School of Economics and Political Science (LSE), with visits to New York University's (NYU) Politics Department and Harvard University. Studying at three different institutions during my PhD allowed me to take extensive coursework and gave me the opportunity to present and be exposed to diverse research.

Before Essex, I was a Lecturer in Comparative Politics at the Department of Politics and International Relations (DPIR) at Oxford University and a Non-Stipendiary Research Fellow at Nuffield College. Before that, I was a post-doctoral researcher at ETH-Zurich Public Policy Group (Chair: Dominik Hangartner), a fellow at Harvard-IQSS, and was part of the Visiting Scholars Program at NYU-Politics department.

I have trained and mentored young researchers; I have designed and taught core and advanced courses in comparative politics, political economy, and quantitative methods at Essex, Oxford and LSE, including core courses for the Politics, Philosophy, and Economics (PPE) undergraduate at Oxford, and PhD-level causal inference and data science courses. At the Essex Government Department, I am the Q-step (Quantitative methods lead), and I teach both the Introductory Statistics Course, Intermediate, and the Advanced Quantitative Methods course, which, in addition to causal inference methods, contains data science tools and machine learning. I am also a regular invited teacher at LSE (currently teaching on Applied Econometrics for Economic Development Policy MSc course) and Oxford Spring School in Advanced Research Methods, where I have my own Causal Inference. My students are very satisfied with my teaching: last academic year, my courses received an average rating of 4.65/5. I also greatly enjoy teaching, which provides an immediate sense of reward vs the longer-term gratification of research.

I also have supervised numerous MSc students, currently supervise PhD students, mentor postdoc researchers, and regularly hire Research Assistants from Latin America and help them pursue a PhD and build an academic career. Felipe Torres, my first DPhil in Politics (Oxford) placed as post doc at LSE.

I am an active colleague who values the academic community first and foremost; I contribute to a broad range of academic activities, formally and informally. At Essex, I kick-started a new Political Economy Political Science Institutions (PEPSI) external speaker series with speakers from top



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

institutions across the world. As head of the Political Economy research division, I have also been overseeing the research in Political Economy, and I founded the PEPSI initiative as a research group. I regularly review papers for the leading journals in political science and economics.

Lately, I have also been involved in leadership in the wider discipline by being one of the organizing chairs for the European Political Science Association Annual Meeting, EPSA 2024 in Madrid (where I rated over 700 abstracts and there were 1700 participants), PolMeth Europe 2025, which was organized with a colleague at LSE and created the EPSA annual preconference on Political Connections.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: STRZELECKA STRZELECKA, EWA
Referencia: RYC2025-055452-I
Correo Electrónico: ewakstrzelecka@gmail.com
Título: Género, conflicto y paz en Yemen y la región MENA: participación política de las mujeres y las diásporas en los procesos de paz y democratización

Resumen de la Memoria:

My research trajectory is distinguished by its international scope, multidisciplinary and social-impact orientation, linking political science, social anthropology, gender, migration, and peace and conflict research to analyse women's political agency in the MENA region. After initial MA research in Morocco, I conducted my PhD thesis in Yemen, where the 2011 uprising transformed my project into a pioneering empirical study of women's participation in revolutionary movements. My PhD, defended in 2015, developed the concept of a political culture of feminist resistance, building on and extending John Foran's theory of cultures of resistance and opposition. My PhD dissertation received three national prizes and distinctions (UGR, AECPA, CEPC) and won a competitive call to be published as a book by the Spanish National Research Council (CSIC, 2017). The concept of a political culture of feminist resistance was further refined in an AECPA Prize-winning book chapter that I published in the edited volume *Yemen and the Search for Stability* (2018).

The war in Yemen that broke out in 2014 redirected my postdoctoral trajectory towards Western Sahara. As a postdoctoral researcher in the ERC-funded CAPSAHARA project, I led the gender component and conducted six months of fieldwork in the Sahrawi refugee camps, analysing women's political participation, governance and conflict in protracted displacement. This experience directly informed my subsequent Marie Skłodowska-Curie Individual Fellowship, which produced the first multi-sited analysis of Yemeni women activists' and refugees' participation in peace processes from exile. The project consolidated my expertise in feminist peace research and the WPS agenda and generated new empirical and conceptual insights into cycles of engagement and disengagement in diaspora peace activism.

My new line of research builds on this trajectory and develops an ambitious agenda at the intersection of gender, peace, conflict, exile and transnationalism. Using Yemen as a core entry point and drawing on multi-sited fieldwork across selected MENA and European countries, it examines how conflict-induced displacement reshapes political agency, participation, leadership and influence among women and men activists. It advances a new and more nuanced gender analysis of transnational peace activism, identifying mechanisms that enable or hinder engagement across homeland, host-country and transnational political arenas, and aims to produce gender-responsive frameworks that strengthen inclusive and sustainable peacebuilding.

Relative to my previous work, which established my expertise in women, conflict and peace, this new line moves beyond a women-centred approach by adopting a relational gender perspective, introducing a comparative transnational design and developing new theoretical tools to analyse gendered political agency in contexts of displacement. Drawing on my academic trajectory and policy advisory experience, my aim is to consolidate a coherent, independent and internationally visible research agenda on gender, peace and security in transnational contexts.

Resumen del Currículum Vitae:

I am an Assistant Professor of Political Science and a member of the EU-funded Jean Monnet Chair at the University of Wrocław (Poland), a Visiting Senior Fellow at the Centre for Women, Peace and Security at the London School of Economics and Political Science (UK), and an Associate Fellow at the German-based think tank Center for Applied Research in Partnership with the Orient (CARPO). Previously, I held a prestigious Marie Skłodowska-Curie Individual Fellowship at Vrije Universiteit Amsterdam (the Netherlands) and held academic appointments in Spain, Portugal, India and South Africa, alongside visiting fellowships and research stays in more than sixteen countries across the Global North and the Global South.

I have authored forty-nine academic publications and policy papers in five languages, including the monograph *Women in the Arab Spring: Constructing a Political Culture of Feminist Resistance in Yemen* (CSIC, 2017). My PhD thesis received Spain's three highest distinctions: the UGR Extraordinary PhD Prize, the AECPA Proxima Accessit Prize and the CEPC Juan J. Linz Proxima Accessit Prize. Publications arising from this work were further recognised through the CSIC's Politeya award for the monograph and the AECPA Prize for Best Book Chapter (2019).

I have participated in sixteen competitive research projects and consortia funded by Spanish institutions and major EU programmes (e.g. COST Action PEACE, H2020 RISE Global-ANSWER, and the ERC Starting Grant CAPSAHARA). I have demonstrated strong capacity to secure and manage competitive research funding, including the MSCA-IF grant for my postdoctoral project *Peace Women* (2021-2024), as well as multiple mobility and travel grants.

My broader project portfolio includes more than twenty knowledge-transfer and applied-research contracts commissioned by national and international organisations, such as UNDP, UNDEF, MAEC, UK FCDO, AECID, GIZ, the Club de Madrid and CARPO, among others. Several of these studies directly informed donor programming, gender-equality strategies, feminist foreign policy initiatives and Women, Peace and Security (WPS) implementation plans, and included tailored training programmes for civil-society actors and government institutions.

My international visibility is reflected in nearly one hundred invited talks and conference contributions at universities, think tanks and research institutes across Europe, the MENA region, Africa and North America. As a university teacher, I have designed and taught BA and MA courses in political science, social anthropology, gender, migration, peace and conflict studies, and supervised around twenty BA and MA dissertations. I have also served on PhD examination committees and contribute actively to international scholarly networks such as MESA, IMISCOE, FIMAM, the Dutch Peace and Conflict Studies Network and the American Institute for Yemeni Studies.

My core areas of expertise include conflict and peacebuilding, the Women, Peace and Security agenda, gender-responsive diplomacy, feminist foreign policy, women's political leadership, social movements, forced migration, mediation, revolutions and socio-political change in the Middle East and North Africa, with particular emphasis on Yemen and the Yemeni diaspora.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: MAMAN , LIBBY
Referencia: RYC2025-054429-I
Correo Electrónico: libby.maman@gmail.com
Título: Trust, Polarization, and Adaptive Governance for a Sustainable Future

Resumen de la Memoria:

I am a Public Administration scholar specializing in regulatory governance, institutional trust, and democratic qualities.

My research evolved through three phases:

1. Measurement Innovation (2017-2022): Development of democratic qualities framework with systematic indicators for regulatory institutions. This produces 2 peer-reviewed publications in Policy & Politics (Q1) and several awards. In addition, this work created methodological tools adopted by scholars and practice.

2. Trust Mechanisms (2020-2024): Investigation of how institutional attributes affect citizen trust using cross-national experiments and comparative analysis. This produced 7 peer-reviewed publications in JPART (Q1, 1/90), Regulation & Governance (Q1), and JEPP (Q1), examining causal effects of regulatory regimes, enforcement styles, and democratic qualities on trust.

3. Behavioral Constraints (2022-Present): Introduction of political polarization as conditioning factor for voluntary compliance and trust. This integrates behavioral insights with regulatory governance, demonstrating that polarization reduces compliance with self-regulatory regimes, opening new research agendas in Behavioral Public Administration. This resulted in 1 publication in Regulation and Governance (Q1), and in 2 additional papers I am currently developing.

International mobility has been a central part of my career. My PhD featured an international advisory committee from IBEI (Spain), Lausanne (Switzerland), and Antwerp (Belgium), facilitating European collaborations. Since 2020, I moved to Spain and have been at IBEI Barcelona working on major European grants: H2020 TiGRE (2020-2023), ERC VCOMP (2022-2024), and ERC RegTrust (2024-2025).

Clear independence demonstrated through: (1) PI of DEMOC project (Generalitat de Catalunya, €15,000), leading application, execution, and policy impact; (2) Team Coordinator for H2020 TiGRE, managing international data collection across eight countries; (3) Conceptual leadership in democratic qualities measurement; (4) Chair of LSA's Regulatory Governance Group (2023-present) and IRSPM's Behavioral Public Administration Group (2024-present).

My proposed line for future research is called "Trust, Polarization, and Adaptive Governance for a Sustainable Future". It shifts my agenda from general regulatory agencies to sustainability and ESG governance, integrating polarization as behavioral constraint and emphasizing adaptive solutions. The project will use comparative analysis and behavioral experiments to identify how political cleavages affect citizen cooperation (voluntary compliance) and how regulatory bodies can design their processes (e.g., participation, enforcement style) to restore trust and foster compliance under conditions of high societal friction. The research is expected to have high scientific and policy impact. Scientifically, it will bridge the fields of Behavioral Public Administration, Regulatory Governance, and Environmental Policy, creating a new research agenda on adaptive governance under social strain. Policy-wise, it directly addresses the challenges of regulatory enforcement in highly politicized domains (e.g., climate change, energy transition), providing European institutions and national governments with actionable knowledge to improve regulatory effectiveness and enhance citizen trust.

Resumen del Currículum Vitae:

In less than 3 years after completion of my PhD, I have published 9 peer-reviewed publications (8 of them in Q1 journals), and several more undergoing R&R. I have successfully attracted research funding from competitive sources. My h index is 6, and I have 111 citations (Google Scholar).

My primary contribution to the generation of knowledge is the development of a conceptual framework and systematic indicators for measuring the democratic qualities (transparency, accountability, participation, and inclusiveness) of regulatory agencies. This work resulted in a unique cross-national dataset (measuring 50 agencies across Europe), which I led with EU funding, filling a significant gap in the literature by enabling systematic comparative evaluation of regulatory institutions qualities. I have communicated these findings through high-impact publications, including articles in JPART, Regulation & Governance, and my solo-authored, award-winning article in Policy & Politics.

In addition, I have contributed significantly to the knowledge of institutional trust, investigating its determinants and consequences. My work moves beyond static conceptualizations, focusing on how institutional design and governance qualities cultivate public trust and how this impacts voluntary compliance. In addition, I explored the dynamics between trust domains, utilizing large survey data, developing the concept of "trust ecology". I have designed and conducted original experimental surveys across the EU to test novel hypotheses on institutional trust formation, demonstrating how varieties of regulatory regimes affect citizens' trust in regulated firms (published in JEPP, Journal of Trust, and European Political Science Review), and investigating how political polarization interacts with trust to influence compliance effectiveness (published in Regulation and Governance).

Methodologically, I developed technical capacities in quantitative research design, including Survey Experiments, structural equation modelling (SEM), and Bayesian Measurement Development (IRT). I am highly proficient in data analysis using R. I have consistently secured substantial funding (through competitive fellowships and grants). As a Principal Investigator, I secured the DEMOC project (€15,000) from the Generalitat de Catalunya (and was the only postdoctoral research selected, among established professors in Catalan universities).

I am deeply committed to training new scholars, having successfully supervised 10 Master's students (at IBEI) on their theses and contributing to their career development (many of them were accepted and continued to doctorate studies). My teaching record includes designing and delivering compulsory MA courses in Public Management and Research Methods, training students in core theories and quantitative application, as well as elective course on Trust and Governance Quality.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Finally, I hold active leadership positions in scholarly associations, acting as the Chair of the LSA's Regulatory Governance group (since 2021) and Chair of the IRSPM's Behavioural Public Administration group (since 2022), and I actively contribute to the evaluation of research as an ad-hoc reviewer for top-tier journals.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Ciencias sociales

Nombre:

GONZÁLEZ LEONARDO, MIGUEL

Referencia:

RYC2025-056563-I

Correo Electrónico:

miguel.gonzalez.leonardo@gmail.com

Título:

Population geographer and demographer with expertise in geographic data science

Resumen de la Memoria:

I have employed quantitative methods and both digital and traditional data to study human mobility patterns, internal and international migration, and population change at national and subnational scales. My research has demonstrated academic and societal impact. I have published research outputs in leading Q1 journals in JCR and SJR, and have actively promoted knowledge transfer through policy-oriented publications, data-explorer tools, and collaborations with civic initiatives and international organisations such as the United Nations. My contributions span a range of topics, including the internal migration of human capital, the impacts of COVID-19 on mobility patterns, and the trajectories and consequences of population decline.

During my PhD, I conducted a novel study on internal migration by educational attainment in Spain. I found significant and increasing brain drain in peripheral Spanish regions. For instance, 35% of young adults with a university degree left Castile and León through internal migration, with the highest out-migration rates observed in provincial capitals. The results have been cited 334 times on Google Scholar, covered by leading media outlets such as El Mundo and ABC, discussed in the Spanish Congress of Deputies, and informed policy measures on brain drain and depopulation in left-behind regions.

Within the framework of 2 projects funded by Research England and the Spanish Government, I combined digital and traditional data to lead the first publications worldwide examining the impact of the COVID-19 pandemic on population movements, testing the “urban exodus” hypothesis. I found an increase in movements away from large cities across the Global North, whereas no such trend emerged in the Global South. This research has received 514 citations, including 2 scientific articles with 169 and 150 citations. The findings were disseminated by major Spanish and international media outlets, such as El País and Der Standard, and discussed in the IOM Migration Report 2024.

I employed sequence analysis to identify and characterise population decline trajectories across Spain’s 8,130 municipalities. I found that rural municipalities experiencing moderate or temporary population loss still have the potential to mitigate depopulation, whereas those undergoing persistent and severe decline have limited capacity to slow population shrinkage. This work aims to inform strategic and effective investments for rural development. The results were covered by RTVE, discussed in the OECD’s Shrinking Smartly and Sustainably report, and received substantial engagement on social media, ranking among the top 1% of research outputs in Altmetric.

I have been the principal investigator for the projects “Long Short-Term Memory Models for Population Projections at the Intra-Urban Level in Greater Mexico City”, “Intensity and Impact of Internal Migration by Educational Attainment in Latin American”, and “Quantifying and Correcting Biases in Mobility Data Extracted from Digital Footprints”, funded by the United Nations and El Colegio de México. These projects have been conducted in collaboration with researchers from the University of Liverpool (UK), the University of California, Santa Barbara (USA), the University of Queensland (Australia), and the United Nations Economic Commission for Latin America and the Caribbean (Chile).

Resumen del Currículum Vitae:

I am a population geographer and demographer with expertise in geographic data science. I hold a PhD in Demography (Summa Cum Laude and 2022 Extraordinary PhD Award) from the Centre for Demographic Studies and the Autonomous University of Barcelona. I have worked as a Researcher at the International Institute for Applied Systems Analysis (Austria), the Centre for Demographic, Urban, and Environmental Studies at El Colegio de México, and the Department of Geography and Planning at the University of Liverpool (UK). I have undertaken research visits at the Max Planck Institute for Demographic Research (Germany) and the United Nations Economic Commission for Latin America and the Caribbean (Chile). I hold accreditation at the rank of Associate Professor in both Spain and Mexico.

I have published 31 scientific articles in JCR and SJR journals, including 19 in Q1 journals in Demography and Geography, such as Demography, International Migration Review, Population, Space and Place, Geographical Analysis, and the Journal of Rural Studies. I have co-authored 1 book, 3 book chapters, and 13 policy-oriented publications. I am the first author of 79% of my publications and the corresponding author of 75%. My work has received 949 citations on Google Scholar, including 2 scientific articles with 169 and 150 citations. I have been recognised with the 2023 Best Scientific Article Award from the Spanish Geographical Association, the 2023 Top Cited Article Award from Population, Space and Place, and the 2022 Young Researcher Award from the Spanish Regional Science Association.

I have been the principal investigator for 3 projects funded by the United Nations and El Colegio de México, and a member of research teams on 6 projects funded by the Spanish Government, Research England, and the European Union, including 2 European Commission projects of €3 million each. I have held editorial roles in several reputable journals (e.g., Population, Space and Place and the Journal of the Royal Statistical Society: Series A) and have served as a reviewer for leading journals (e.g., PNAS, Demography, Urban Studies, and Comparative Migration Studies). I have presented my work at 27 international conferences (e.g., the International Population Conference, the European Population Conference, and the Population Association of America Annual Meeting). I have taught courses on demographic analysis, data processing and analysis, and data science to university students and United Nations practitioners, and have supervised research assistants and postdoctoral researchers.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Beyond academia, my research has demonstrated clear societal relevance and knowledge transfer. My findings have been covered by major Spanish and international media outlets (e.g., El País, El Mundo, ABC, and Der Standard), and have received substantial engagement on social media, ranking among the top 1% of research outputs in Altmetric. My work has been discussed by civic initiatives and in the Spanish Congress of Deputies. It has informed policy measures on brain drain and depopulation in left-behind regions, and has been cited in the IOM Migration Report 2024 and the OECD's Shrinking Smartly and Sustainably report. I have also contributed directly to policy development by co-authoring a policy report published by the United Nations Economic Commission for Latin America and the Caribbean.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: UDOVYK SAVIAK, OKSANA
Referencia: RYC2025-056488-I
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Título: Transformative Recovery

Resumen de la Memoria:

My research trajectory is driven by the question of how societies can rebuild differently after disaster. Over the past 15 years, I have worked at the intersection of risk governance, sustainability transitions, post-disaster recovery, and feminist governance—gradually converging these strands into a new paradigm I term transformative recovery. This concept reframes recovery not as a return to pre-crisis normality, but as a strategic entry point for systemic, sustainability- and justice-oriented transformations.

My foundational phase (2009–2014) focused on environmental risk governance during my PhD in Sweden. Within the European RISKGOV network, I contributed to comparative analyses of science–policy interfaces in complex socio-ecological systems, exploring uncertainty, participation, and institutional learning. This phase produced 13 outputs (including five Q1 articles) and shaped my enduring interest in how knowledge, power, and uncertainty interact in decision-making on risk and crisis.

Following my PhD, I applied this expertise to global sustainability policy frameworks by joining the UN World Tourism Organization (UNWTO) in Spain. There, I worked on SDG indicator development (8.9) and contributed to high-level policy syntheses, including the Lisbon Declaration. This experience deepened my understanding of the science–policy–practice interface and its tensions.

A further postdoctoral fellowship in Canada enabled me to study sustainability transitions in post-disaster Ukraine, resulting in peer-reviewed publications and the award-winning documentary *Searching4Opportunities* (2017). This marked my first direct empirical engagement with crisis as a site for transformation.

Between 2016 and 2019, I worked on two EU Horizon 2020 projects (ROCK, EdiCitNet), addressing urban sustainability transformations through participatory design and systems innovation. These projects expanded my methodological repertoire and reinforced the value of co-production and intersectional approaches in shaping inclusive, resilient futures.

From 2019 to 2022, I led the UNDP Innovation Lab in Ukraine. Projects such as Community Safari and Butterfly Effect integrated participatory foresight, digital tools, and grassroots experimentation. With the onset of war, the Lab shifted toward recovery, revealing the need for models that not only restore but reimagine futures through a sustainability lens.

Since 2022, I have been based at INGENIO (CSIC-UPV), first through a CSIC-INP fellowship and currently as a Marie Skłodowska-Curie Fellow (Metamorphosis). My research spans post-DANA recovery in Spain, post-war urban planning in Ukraine, and net-zero transitions in Sweden, resulting in 13 outputs and public engagement initiatives, such as the RENACIMIENTO exhibition. Through this trajectory, transformative recovery has emerged as a unifying and original research line.

Through the Ramón y Cajal programme, I propose to consolidate this field. Drawing on disaster risk reduction (UNDRR 2015), sustainability transitions and transformations (Loorbach et al. 2017; Stirling 2015), and feminist governance (Arora-Jonsson 2013), I will develop conceptual frameworks, decision-support tools, and applied prototypes to operationalise transformative recovery as a strategic governance mode.

Resumen del Currículum Vitae:

I hold a PhD in Environmental Governance (Sweden), with over 15 years of international research experience across nine countries. My academic trajectory combines scientific excellence, institutional leadership, and policy impact in the fields of sustainability, crisis recovery, and urban transitions. My current line—transformative recovery—synthesizes an evolving research agenda spanning risk governance, sustainability transitions, and feminist approaches to post-disaster governance.

I have authored over 50 academic outputs, including in Q1 journal articles as first or last author. I have contributed to high-level policy briefs and reports for the UN, European Commission, and national governments. My research on post-DANA recovery has been recognised with the 2025 National Research Award (Spain), and my documentary *Searching4Opportunities* received international awards for its science–society relevance.

I have demonstrated scientific leadership as principal investigator of six international projects (Marie Curie, CSIC, UNDP, Horizon Europe) and as coordinator of interdisciplinary teams with tangible societal outcomes. I have developed digital tools and participatory methods for recovery planning (e.g., ReStart Ukraine), integrating experimental governance with real-world transfer. I have co-designed recovery strategies with cities, ministries, and UN agencies, working on migration return, post-war planning, and sustainability transitions.

Currently, I am a Marie Skłodowska-Curie Fellow at INGENIO (CSIC-UPV), where I am developing the emerging line of transformative recovery through the project Metamorphosis (2024–2026), with empirical cases in Spain, Ukraine, and Sweden. Previously, I directed the UN Innovation Lab in Ukraine (2019–2022), where I led a major reorientation of the Lab’s mission toward post-war recovery, coordinating pioneering initiatives such as ReStart Ukraine.

My trajectory is deeply international, interdisciplinary, and action-oriented. I maintain research collaborations with institutions such as KTH (Sweden), Kyiv-Mohyla Academy (Ukraine), University of Alberta (Canada) and I actively participate in global research networks including STRN, EU-SPRI, and i-Rec. I have taught and supervised at universities in Canada, Sweden, and Spain, co-supervise PhD theses, and have mentored over 15 master’s students. I regularly serve as reviewer and guest editor for international Q1 journals.

This trajectory demonstrates consolidated independence, international leadership, scientific excellence, and a strong commitment to social transfer, epistemic justice, and methodological innovation. I hope that with the Ramón y Cajal programme there will be a strategic opportunity to establish an internationally visible research hub on transformative recovery in Spain, contributing to European leadership in resilience, just transitions, and feminist post-disaster governance.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: DIESSNER, SEBASTIAN
Referencia: RYC2025-054755-I
Correo Electrónico: s.diessner@fgga.leidenuniv.nl
Título: Economic policy, technological change and institutions

Resumen de la Memoria:

I am a political scientist working on economic policy, technological change and institutions. My research is concerned with how key actors – EU institutions, national governments, and private firms – respond to two types of shocks: first, economic shocks, such as the Eurozone crisis and the COVID-19 crisis; and second, technological shocks, such as the proliferation of information and communications technology. In my academic career to date, I have established a reputation as an emerging leading scholar in European economic governance, developing the experience and skills necessary for independence and leadership in grant projects and in teaching. I have published 14 Q1 papers and a book with a top-5 publishing house. My entire research career has been pursued abroad. After completing a BA and then an MA in European Studies at the University of Hamburg in my native Germany, I arrived at the London School of Economics and Political Science in 2013 to pursue a master's degree and then a PhD in Political Economy. During and after my PhD, I have secured highly competitive fellowships and grants, including the Max Weber Fellowship, a personal stipend awarded by the Fritz Thyssen Foundation, a Leverhulme Research Project Grant, a Starters Grant from the Dutch Ministry of Education and Science, and the prestigious Jean Monnet Fellowship at the EUI. My experience with research grants and as an investigator in large-scale international research projects puts me in a strong position to attract funding and to lead research teams.

Throughout my doctoral and post-doctoral research, I have strived to develop the skills necessary to carry out a complex research agenda which addresses pressing political and societal concerns. Based on this foundation, I am now able to extend my research agenda to the next frontier in economic governance, namely, to the innovative area of anti-money laundering. Money laundering is a pressing societal concern in Europe and across the globe. The European Union has belatedly woken up to this challenge: the European Commission has proposed to set up a new Anti-Money Laundering Authority (AMLA) which the European Parliament and the EU member states finally agreed to in 2024, after two decades of dissent that go back to the origins of Europe's Economic and Monetary Union. Why, then, is the EU finally centralizing anti-money laundering at the supranational level, after twenty years of disagreement? Through this line of research, I put forward a novel comparative political economy approach to shed light on these questions. A comparative political economy perspective highlights the institutional complementarities between reforms of anti-money laundering, on the one hand, and reforms of adjacent institutions, such as the judiciary, on the other hand. Theorizing and analysing illicit financial activities through this lens has the potential to greatly enrich extant scholarship in comparative political economy, which has focused predominantly on formal economic activities so far. The line of research thus makes both theoretical and empirical contributions to extant scholarship and holds important societal implications. The Ramón y Cajal fellowship provides the ideal basis to carry out this research, contributing both to Spanish and international academia and to our understanding of a pressing political and societal issue.

Resumen del Currículum Vitae:

I completed my PhD in European Political Economy at the London School of Economics in 2020 with a dissertation on institutional change in central banking in Europe and Japan, under the supervision of Paul De Grauwe and Cheryl Schonhardt-Bailey. My dissertation was examined by David Soskice and Amy Verdun, passing the examination with the highest possible distinction at the LSE, "no corrections".

My academic career has taken me through some of the top Political Science departments in Europe. After the LSE, where I continue to be a Visiting Fellow, I obtained a prestigious Max Weber Fellowship at the European University Institute in 2019-2021, conducting post-doctoral research under the supervision of Philipp Genschel. I have since then been appointed as an Assistant Professor at Leiden University, where I co-direct the research group on Political Economy and Public Policy together with Alexandre Afonso. In 2025, I won the highly selective Jean Monnet Fellowship at the European University Institute, where my mentor is Waltraud Schelkle.

The scientific contributions and international standing of my research are evidenced by publications, awards and grants. My work has resulted in 14 Q1 papers and a book with a top-5 publishing house, while my PhD was prized with a Young Researcher Award from the Écoles des Hautes Études en Sciences Sociales Fondation France Japon. My post-doctorate at the EUI was co-funded by a competitive stipend from the Fritz Thyssen Foundation, which I used to complete a book project on the European Central Bank. The book has been promoted through a series of launch events at top European and US universities (including Harvard and New York University), the European Commission Joint Research Centre, and the European Central Bank in 2020-2021. During this period, I also obtained a rapid response grant from the US Social Science Research Council to investigate the comparative political economy of COVID-19. Lastly, together with scholars from the United Kingdom and Italy, we have won a Leverhulme Research Project Grant in 2022 in order to shed light on technological and institutional change during the transition to the knowledge economy. This project has resulted in a novel data infrastructure – the Knowledge Economy Index –, for which we have created a dedicated website to advance comparative research on the causes and consequences of technological and institutional change across Europe and the US, including the unfolding rollout of artificial intelligence.

Beyond the academic realm, my work has attracted the attention of policy-makers and civil society organizations. My research on European economic governance has led to briefing papers requested by the European Parliament Committee on Economic and Monetary Affairs as well as policy papers commissioned by the NGO Positive Money Europe on how to improve the democratic accountability of the European Central Bank. I am equally committed to sharing research findings with non-specialist audiences across national public spheres, including through contributions to popular blogs (like Agenda Pública and LSE EUROPP) and through opinion pieces for news media outlets in different European countries (such as Le Monde, Le Figaro, El País, Il Sole 24 Ore, De Tijd and NRC Handelsblad).



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: MAESTRE ANDRÉS, SARA
Referencia: RYC2025-056885-I
Correo Electrónico: sara.maestre88@gmail.com
Título: Enfoque transdisciplinario crítico sobre soluciones basadas en naturaleza justas para fomentar la conservación de la biodiversidad, la adaptación y mitigación del cambio climático y el bienestar humano

Resumen de la Memoria:

I am a transdisciplinary critical socio-environmental scholar analyzing global climate and biodiversity conservation policies. I am a principal investigator and researcher at the Institute of Environmental Science and Technology (ICTA) of the Universitat Autònoma de Barcelona (UAB). My research has theoretically, conceptually and methodologically shaped the fields of human geography, political ecology and the study of socio-ecological systems by designing and evaluating strategies, policy instruments and processes that contribute to building resilient, just and liveable territories as well as contributing to biodiversity conservation. I have advanced knowledge on four main research lines: a) social perceptions of the effectiveness and fairness of climate policies; b) critical geographies of habitat banking and the neoliberalisation of conservation; c) transitions and transformative change focusing on the role of social innovations and commons-led coproduction; and d) transdisciplinarity, knowledge coproduction and participation to improve the governance of nature-based solutions and green infrastructure. My research during the Ramon y Cajal Fellowship would focus on understanding and providing novel and insightful theoretical, methodological and empirical insights on the just and transformative scaling of nature-based solutions (NbS). While NbS are of growing political relevance to enhance climate resilience, human well-being and biodiversity conservation, they have to be implemented at tremendous scale to achieve their expected social, economic and ecological benefits. If not executed properly, scaling NbS can reinforce or amplify existing privileges and injustices in process and outcomes and hinder the potential for positive change. I hypothesize that NbS at wide scale can only generate lasting transformative change if the scaling approach towards geographical expansion (outscaling) is embedded in the political, organisational and cultural context. Such a scaling approach must include: i) scaling up to higher policy level changes in laws, policies, or norms to foster institutional change for NbS; ii) scaling down by (re-)allocating necessary resources and means, e.g. incentives, regulations, funding, to support NbS implementation and impact; iii) scaling in by ensuring organisations have the structure, capacity, functions or skills to deliver NbS; and iv) scaling deep through achieving transformative change in practices, norms, beliefs and values and reflexive learning. My research will contribute to providing empirical evidence and real-world cases exemplifying just (out)scaling of NbS. By promoting a transdisciplinary approach, co-creation, testing and improvement of NbS scaling will be conducted, with an important focus on distributional, procedural and recognition injustices being faced. Building on close collaboration with stakeholders, my research will analyse the plural values of nature and how they are taken into account in political decisions, trade-offs between NbS objectives, and the justice outcomes of different governance arrangements, policies and financial strategies for NbS and well as identify stakeholders' needs and demands articulating them in an integrated conceptual framework.

Resumen del Currículum Vitae:

I am a transdisciplinary critical socio-environmental scholar analyzing global climate and biodiversity conservation policies. I am a principal investigator and researcher at the Institute of Environmental Science and Technology (ICTA) of the Universitat Autònoma de Barcelona (UAB). I earned my PhD in Environmental Science and Technology (ICTA-UAB, 2016), I hold a Master degree in Ecological Economics and Environmental Management (ICTA-UAB, 2011) and a bachelor degree in Environmental Sciences from the UAB (2010). My academic leadership and research excellence is evidenced by my leading role in several large-scale projects (2 H2020, 2 Biodiversa, MITECO-funded project, Càtedra Barcelona-UPF) and my participation in more than ten international and national research projects. I am actively involved in international networks for research and grant-writing. I have established a strong record of 35+ peer-reviewed publications (20 in JCR-indexed journals, 6 book chapters). Some of these publications in prestigious journals such as Nature Communications (first author; IF:17; Q1) and receiving high citations, e.g. in Climate Policy (first author, citations= 525 (GS), IF=7.1, Q1). My overall metrics are citations: 1270 (GS); H-index: 13 (GS). My research career has developed across different countries in Europe, primarily Spain, United Kingdom, Germany, The Netherlands, Sweden, and countries in Latin America, including Costa Rica, Colombia and Ecuador, and at outstanding university departments and research centers, including: the Institute of Environmental Science and Technology- Autonomous University of Barcelona; the Geography Department at the University of Cambridge; the IRI THESys research group at the Humboldt University of Berlin; Leuphana University of Lüneburg; and Dutch Research Institute for Transitions. I was member of the prestigious Postdoc Academy for Transformational Leadership (2021-2023) aimed at training the next generation of leaders in sustainability and transformation research fostering transdisciplinarity. I have organised sessions and delivered 30+ conference presentations and invited talks, and have co-edited a Special Issue in the Journal of Political Ecology. I have been a reviewer for the prestigious Austrian Science Fund (FWF). I co-supervise a PhD student D. Ruiz at ICTA-UAB in collaboration with the Humboldt Institute (Colombia). I supervised 11 MSc theses, I have hosted externally supervised PhD students from abroad: O. García Antúnez, University of Copenhagen (Denmark, 2023); M. Maciel, University of Aveiro (Portugal, 2024); and I teach at three MSc and several BSc level courses in the Universitat Autònoma de Barcelona and the International University of Catalonia. Member of a PhD Examination Board at UOC. Member of 16 tribunals of Msc theses at ICTA-UAB. Reviewer at 15+ highly ranked peer review international journals. I am strongly committed to transdisciplinary research and generating impact on society. I have significantly contributed to transfer the knowledge I produce to society in the form of transdisciplinary coproduction and learning spaces involving community-based organisations, public and private entities.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: VALENCIANO MAÑÉ, ALBA
Referencia: RYC2025-057192-I
Correo Electrónico: albavama@gmail.com
Título: A Political Anthropology of Circulation, Value and Everyday Economies

Resumen de la Memoria:

My research trajectory is grounded in more than a decade of sustained ethnographic work in West-Central Africa, particularly Equatorial Guinea, where I have conducted 32 months of cumulative fieldwork since 2007. This long-term engagement has enabled me to develop a coherent scholarly programme that bridges economic anthropology, African Studies, political anthropology and postcolonial theory. Through 23 publications, I have advanced original analyses on moral economies, redistribution, gendered political authority, material circulation and colonial legacies. My work centres on how people organise their material lives under conditions shaped by extraction, authoritarian governance and global inequality, foregrounding how ordinary actors sustain, reinterpret or challenge broader political-economic structures.

The research line I will develop builds directly on this foundation. Expanding my Beatriu de Pinós project (RECIR), I will examine how circular economy (CE) policies materialise within the transnational second-hand clothing chain connecting Sabadell, Copenhagen and Equatorial Guinea. Moving beyond technocratic visions of sustainability, my aim is to analyse how circularity operates in practice through ambiguous infrastructures, partial formalisation and informal labour regimes. This perspective situates ecological transition within wider processes of governance, inequality and value circulation.

By integrating African debates on informality (understood as a relational field rather than the opposite of formality) with anthropology of waste and value, the project develops a comparative framework to analyse how value, risk and responsibility are produced and redistributed during ecological transition. Methodologically, it combines multi-sited ethnography, actor mapping and in-depth study of sorting, export and redistribution infrastructures.

Resumen del Currículum Vitae:

I am a social anthropologist specialising in the political economy of everyday life in West-Central Africa, with longstanding ethnographic engagement in Equatorial Guinea (32 months of cumulative fieldwork since 2007). My research bridges economic anthropology, African studies, and postcolonial theory, analysing how infrastructures, markets and circulatory practices shape moral economies, gender relations, and material inequalities. I work at the intersection of micro-ethnography and broader historical and political questions, including extractivism, racial capitalism, and colonial legacies.

I completed my PhD at the University of Barcelona (2017, Cum Laude), with international research stays at Hofstra University (New York), the University of Liverpool, and the University of Manchester. My postdoctoral trajectory has been predominantly international: I worked for five years at the University of Leipzig, where I taught in English, coordinated a PhD programme, supervised MA theses as main supervisor, and participated in an MA programme accreditation and competitive grant-writing for the DAAD and the BMBF. I subsequently received a Maria Zambrano Fellowship (Spain) and a BMBF-Mecila Fellowship (Germany). I am currently Principal Investigator of the Beatriu de Pinós-funded project RECIR: Reconsidering Circularity, which examines second-hand clothing economies through multi-sited ethnography. Throughout my career, I have also developed extensive work in provenance research, museum collaborations, and heritage documentation in both Spain and Equatorial Guinea, contributing to public debates on colonial archives, visibility, and decolonisation.

My work has led to 23 publications across international journals and book presses, including Journal of Contemporary African Studies, Visual Anthropology, Disparidades, Research in Economic Anthropology, the Oxford Research Encyclopaedia, and manuscripts under review at Brill and Economic Anthropology. I present regularly at major conferences (AAA, EASA, ECAS) and review for high-impact journals (African Studies Review, Ethnic and Racial Studies, Democratization, among others). I have extensive teaching experience in Spain and Germany (over 740 hours at Bachelor and MA level), I have supervised 22 MA theses, have begun supervising doctoral dissertations, and currently I lead a teaching-innovation project in economic anthropology at the UAB.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: VALENTIM , VICENTE
Referencia: RYC2025-054512-I
Correo Electrónico: vicente.valentim@ie.edu
Título: The causes and consequences of political norms

Resumen de la Memoria:

Vicente Valentim (PhD European University Institute, 2021) is Assistant Professor at IE University and an Associate Member of Nuffield College, University of Oxford. His research agenda asks what citizens consider acceptable to do in a democracy, why that is, and how it changes. This agenda has resulted in 15 publications in leading Q1 journals, which have been cited over 600 times, won some of the most prestigious international awards, and were included in syllabi in leading departments in Europe and the United States. This line of work culminated in the publication of his first monograph, *The Normalization of the Radical Right: A Norms Theory of Political Supply and Demand* (Oxford University Press, 2024). The book received major awards (APSA Robert A. Dahl Award; APSA Democracy & Autocracy Best Book; shortlisted for APSA's Luebbert Prize and ECPR Rokkan Prize), was published in three languages, and was listed as one of the books of the year by the Financial Times and Piedras de Papel.

The main goal of Valentim's academic work is to explain why right-wing extremist and anti-democratic behavior has recently increased in Western democracies. The standard explanation would be that citizens are, themselves, becoming more extremist or anti-democratic. However, this type of behavior often increases very fast, while we know from previous work in the social sciences that preferences and attitudes are fairly stable in the long term. This makes it unlikely that large-scale, short term changes in behavior can be fully accounted for by a change in the political views of democratic citizens.

His research shifts focus to an alternative explanation for behavioral change: social norms. While norms still play a rather secondary role in much of the European politics literature, he argues that they can help explain why, even though preferences tend to be stable, individuals can suddenly become more willing to engage in illiberal behavior. Indeed, his work shows that recent increases in right-wing extremist and anti-democratic behavior are often driven by individuals who had long held these preferences in private, but who did not act on them due to fear of social punishment. Recently, a number of political events have made these individuals perceive that norms against their views have weakened. As a consequence, they have become more comfortable acting on what they already thought, but would not publicly show. He tests this argument with innovative ways of measuring difficult concepts like social norms and preference falsification and by employing state-of-the-art causal inference techniques. To do so, he also develops innovative empirical tools that allow one to study the views that individuals hide to comply with established norms.

Resumen del Currículum Vitae:

Valentim is currently an Assistant Professor of Political Science at IE University and an Associate Member of Nuffield College, University of Oxford. He earned his PhD in Political and Social Sciences at the European University Institute (EUI, Italy) in 2021. During his doctoral studies, he held a visiting research position at Stanford University (2019), and his thesis committee included leading international scholars such as Elias Dinas (EUI), Miriam Golden (currently at Stanford), Catherine De Vries (Bocconi), and Vasiliki Fouka (Stanford). His PhD dissertation received the ECPR Jean Blondel Prize for Best Thesis in Politics, the EUI Linz-Rokkan Prize, and the Best Thesis Prize from the Portuguese Political Science Association. Before joining IE, he worked at the University of Oxford as a Postdoctoral Prize Research Fellow in Politics at Nuffield College.

Four years after his PhD, Valentim has published 15 articles in top Q1 journals, including the *Journal of Politics* (2x), *British Journal of Political Science* (3x), *Comparative Political Studies* (2x), *Political Behavior*, and *Political Science Research and Methods*. Of these publications, 5 are single authored and 5 others have him as first author.

He is the recipient of many prestigious awards, including the A.SK Bright Mind Award, the ECPR Jean Blondel Best Thesis Prize, the Joseph L. Bernd Prize for best article in the *Journal of Politics*, the Best Article Award from APSA's Representation and Electoral Systems Section, the CES Carolina de Moyer Young Scholar Award, the Distinguished Young Scholar Award from APSA's Political Psychology Section, and the GESIS Klingemann Prize for best CSES scholarship, among others.

As of December 2025, his work has been cited a total of 624 times (h-index 11; i10-index 13).

Some of these projects were funded by competitive schemes, where Valentim led teams of research assistants who collected cross-national data on public opinions and elite perceptions.

Valentim has made significant efforts to disseminate the main findings from his research. To that end, he has participated in 19 leading international conferences (including APSA, EPSA, and MPSA), given a total of 49 invited talks (including at Yale, Princeton, the LSE, Sciences Po, and Rochester), and written or given interviews for leading European newspapers (including the Financial Times, Die Zeit, and The Guardian).

He also plays an active role in the academic community. He has served as a reviewer for top journals (APSR, AJPS, JOP, BJPS, CPS, among others), as a grant evaluator for the European Research Council (ERC) and La Caixa Foundation, and as an instructor at the ECPR Summer and Winter Schools, the Oxford Spring School, and other international methods programs.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Valentim also has extensive teaching experience, having taught at three universities, at leading methods schools, and supervised graduate students.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: DOMINGO RUIZ, DARIO
Referencia: RYC2025-055008-I
Correo Electrónico: ddomingorui@gmail.com
Título: Development of multiscale flexible tools for a better land management

Resumen de la Memoria:

My research focuses on understanding and modelling land-use dynamics across the urban–natural gradient under current socioeconomic and climate change pressures. These processes reshape spatial patterns at multiple scales, posing critical challenges for sustainable territorial planning and ecosystem conservation. My scientific contributions are structured around two main research lines.

(i) Urbanization dynamics and land-use change modelling.

I analyse past and future land-use transitions with the aim of minimizing land take and fostering compact, liveable, and sustainable urban environments. My work integrates geospatial data, remote sensing, and modelling tools that explicitly incorporate the main drivers of land change—including socioeconomic trends, planning frameworks, and environmental conditions. Through scenario-based modelling, I assess alternative development pathways and support evidence-based decision-making to guide sustainable planning strategies.

(ii) Forest ecosystem services, carbon storage, and biodiversity under global change.

I investigate the value, dynamics, and vulnerability of forest ecosystems as key reservoirs of carbon and biodiversity. My research evaluates how environmental risks—such as wildfires or pest outbreaks—affect forest resilience, and develops modelling tools and geospatial analyses to support sustainable forest management. These efforts contribute to designing adaptation strategies that enhance ecosystem services in a rapidly changing climate.

My trajectory is strongly interdisciplinary and methodologically diverse, spanning remote sensing (satellite, LiDAR, UAV), machine-learning approaches, land-use/land-cover simulators, and the integration of socioeconomic and environmental information within a geographic framework. International research stays at the USDA Forest Service (USA), the Norwegian University of Life Sciences, and a postdoctoral position at WSL (Switzerland) have consolidated a robust network of collaborations and broadened the applicability of my research. Overall, my work aims to provide rigorous scientific insights and practical tools to support sustainable landscape planning and environmental management.

Resumen del Currículum Vitae:

I hold a PhD with six years of post-doctoral experience and a consolidated research profile in land-use change, urbanization dynamics, and forest ecosystem management. I am the author or co-author of 32 SCI papers (including 3 in press), 13 of them as first author, together with 12 book chapters, 3 national publications, and 1 technical report. My scientific impact includes an h-index of 14 (565 citations in WoS; 604 in Scopus; 852 in Google Scholar). I have presented my work in 41 conferences and 14 seminars and invited talks.

I have participated in 23 research projects, including 7 from the Spanish National Plan (currently in two of them as part of the research team) and 2 funded by the Swiss SNSF. I have secured competitive funding at all stages of my career: JAE-Intro (graduate), FPU fellowship (PhD), and a MSCA-based postdoctoral grant (MS-240621). My technical expertise spans remote sensing technologies (satellite, LiDAR, UAV), machine-learning approaches, scenario-based landscape simulators, and the integration of socioeconomic, environmental, and participatory data for spatial analysis.

My international experience includes PhD research stays at the USDA Forest Service PNW Research Station (USA) and the Norwegian University of Life Sciences, as well as a postdoctoral contract at the Swiss Federal Institute for Forest, Snow and Landscape Research WSL. These collaborations led to multiple joint publications, conference contributions, and participation in research projects. Nationally, I collaborate with institutions such as IPE-CSIC, Universidade de Vigo, and the Autonomous University of Barcelona. I am a member of the Cambium UVa and GEOFOREST Unizar research groups.

I have contributed to knowledge transfer through 13 research contracts, 4 of which I have led, and outreach activities including press articles, one piece in The Conversation, blog entries, TV appearances, and videos. My teaching activity includes 627 hours of lecturing at the University of Zaragoza, Technische Universität Darmstadt, and UVa, participation in a MOOC and a micro-credential, four teaching innovation projects, and 205 hours of training courses. I am accredited as Profesor Titular by ANECA and have supervised 4 Master's Theses, 9 Bachelor's Theses (+6 ongoing), one company internship, and 4 high-school research projects (+3 ongoing).

I serve the scientific community as Editorial Board Member of the Spanish Journal of Remote Sensing and Urban Science, guest editor of special issues in Remote Sensing and Urban Science, reviewer for 18 journals, and evaluator for national research agencies in Spain and Poland. I am a member of IALE, the Spanish Association of Remote Sensing, and the Global Land Programme. My work has received several distinctions, including awards for my Master's Thesis, best contribution at the 2022 Spanish Remote Sensing Congress, the IGEAR Prize (GEOFOREST), and the Consejo Social award (UVa).



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: GOMEZ GOMEZ, RAIMUNDO ELIAS
Referencia: RYC2025-054416-I
Correo Electrónico: rgomez@letras.up.pt
Título: Multiscalar Environmental Footprints and Territorial Development: Integrated Geospatial Analysis from Iberian Municipalities to European Contexts

Resumen de la Memoria:

I am an Integrated Researcher at the Faculty of Letters, University of Porto, supported by a Marie Skłodowska-Curie Individual Fellowship (€172,000, 2023-2025). My research career spans 16 years producing 57 open-access works, including 27 peer-reviewed articles (21 indexed in Scopus/WoS, 8 in Q1-Q3), combining geospatial analysis, environmental science, and sociology.

SCIENTIFIC CONTRIBUTIONS: As PI of MSCA project "SSpaceGX," I developed methodologies integrating satellite remote sensing with sociological theory to map socio-ecological conditions in transboundary biosphere reserves, generating five 2025 publications in international journals including Q1 (City and Environment Interactions, SJR 1.062), advancing knowledge on spatial inequalities, air pollution, and nature conservation. My trajectory demonstrates progressive international visibility: from regional to high-impact international publications (Elsevier, Brill, Frontiers, Warsaw). I secured €522,000 competitive funding as PI or Co-I from European Commission (MSCA €172k), CONICET (€100k), WWF (€60k), ESA (€30k), UNESCO (€20k), AECID (€20k). As PI of six projects (€402,000), I demonstrated capacity to conceptualize original research, manage budgets, coordinate international teams, and deliver policy-relevant outcomes. Technical capacities: advanced proficiency in R (15 years), Python (8 years), JavaScript/Google Earth Engine (5 years), advanced statistics (ML, HMM, PCA, MCA, hierarchical clustering), satellite processing (Sentinel-1/2/3/5P, VIIRS, Landsat, MODIS).

KNOWLEDGE TRANSFER: My research addresses sustainable development, climate change, and environmental justice through applied contracts generating practical tools. WWF contract (€60,000) developed multidimensional illegal hunting typology implemented by provincial authorities in Argentina, reducing incidents 18% (2021-2023). ESA contract (€30,000) produced satellite-based monitoring protocols used in 12 protected areas. Technical reports to UNESCO Biosphere Reserve authorities (Portugal/Spain) informed 2024-2030 management plans. I developed open-access geospatial applications (CoRadiance Explorer, 6,000+ downloads) enabling researchers and policymakers to analyse environmental data. All workflows published in Zenodo/GitHub following FAIR principles (99% open-access).

INTERNATIONALIZATION: Strategic mobility across four countries shaped interdisciplinary expertise. Portugal (2023-current): European networks, five Q1-Q3 publications, international conferences (Cambridge, Prague, Turin), methodological advances. Mexico (UNAM, 2017-2018): classical sociological theory training. Spain (Granada, 2015-2016): European academic networks. Argentina (Misiones, 2012-2023): conservation anthropology and quantitative methods. Published with collaborators from seven countries; fluency in four languages (Spanish, Portuguese, Galician, English C1-C2).

TRAINING AND LEADERSHIP: Supervised three defended PhD theses (15 co-authored publications with one student, now postdoctoral researcher at Porto); one ongoing doctorate. Taught seven courses (2011-2022). Coordinated projects with 12+ researchers. Peer reviewer for 12 international journals.

RECOGNITION: MSCA Fellowship (2023-2025, 3.2% success rate); UNESCO MAB Young Scientist Award (2011); ERC Consolidator Grant evaluation stage (2024)

Resumen del Currículum Vitae:

My research investigates socio-environmental dynamics through integrated geospatial analysis, combining satellite remote sensing, advanced statistics, and sociological theory. This trajectory demonstrates progressive methodological sophistication and international expansion, from Latin American regional protected areas to transboundary European contexts, addressing environmental science, climate change, and territorial development.

TRAJECTORY EVOLUTION: PhD (Misiones, Argentina, 2012-2017) integrated Bourdieu's capital theory with MCA and GIS, producing comprehensive urban social space analysis (Estudios Demográficos y Urbanos Q3, 2021). Postdoctoral research (2017-2021, UNAM Mexico and CONICET Argentina) applied Elias' figurational sociology to conservation conflicts, developing illegal hunting typologies for WWF (€60,000), producing Q1 publications (HALAC, SJR 0.332) informing implemented policies. Current MSCA Fellowship (Porto, 2023-2025, €172,000) integrates satellite processing with sociological theory to develop "geospatial footprints of social competences" – capital dynamics have measurable physical manifestations through atmospheric emissions, nocturnal radiance, infrastructure. This generated five 2025 publications including Q1 (City and Environment Interactions, SJR 1.062).

METHODOLOGICAL CONTRIBUTIONS: I pioneered integrating geometric data analysis (PCA, MCA, hierarchical clustering, random forests) with multi-source satellite imagery (Copernicus Sentinel-5P for pollutants like PM2.5, PM10, Nitrogen dioxide, sulfur dioxide, ammonia, among others; VIIRS for nocturnal radiance; Sentinel-2 for land-use) and ethnographic fieldwork. This multimethod approach addresses single-method limitations, enabling complex socio-ecological coupling analysis across scales. Innovations include open-source geospatial applications (CoRadiance Explorer, 6,000+ downloads) and reproducible workflows (R, Python, JavaScript/GEE) published in Zenodo/GitHub, advancing open science. Tools actively used by researchers in Portugal, Spain, France, Argentina.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

IMPACT: Research addresses territorial development-environmental transformation relationships with direct policy relevance. Contracts with WWF (€60,000), ESA (€30,000), AECID (€20,000) produced tools implemented by conservation authorities, reducing illegal hunting 18% (2021-2023), establishing satellite monitoring in 12 protected areas. Q1-Q3 publications (Elsevier, Brill, Frontiers, Warsaw) address spatial inequalities, air pollution, sustainable development.

FUTURE LINE: "Multiscalar Environmental Footprints and Territorial Development" will analyse atmospheric pollutants (PM2.5, PM10, sulfur dioxide, ammonia, among others) and terrestrial transformations (infrastructure, urbanization, nocturnal radiance) from 8,131 Spanish municipalities to European contexts. First comprehensive multiscalar environmental-economic coupling analysis in Europe, combining Copernicus satellite data with administrative datasets, and survey data. Expected outcomes: 12-15 Q1-Q2 publications, open-access tools, policy reports for Spanish Ministry for Ecological Transition and EU DG Environment, creation of an Iberian Observatory for Multiscalar Environmental Emissions. Builds on proven expertise (15 years statistics, 8 years satellite processing) and demonstrated grant capacity (€522,000 secured).



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: DABEZIES DAMBORIARENA, JUAN MARTIN
Referencia: RYC2025-055413-I
Correo Electrónico: tinchodabe@gmail.com
Título: Antropología ambiental, relaciones multiespecie y gobernanza socioecológica
Resumen de la Memoria:

Mi trayectoria se sitúa en la intersección entre la antropología ambiental, las relaciones multiespecie y la gobernanza socioecológica. He desarrollado una agenda internacional y comparativa centrada en cómo distintos actores [comunidades locales, agencias estatales, organismos internacionales y sectores productivos] interpretan, regulan y conviven con animales, paisajes y riesgos sanitarios. A lo largo de mi carrera he combinado trabajo etnográfico, análisis de políticas públicas, estudios comparados y enfoques interdisciplinarios que integran ciencias sociales, ecología, epidemiología y tecnologías de monitoreo ambiental.

Mi investigación se ha desarrollado en Uruguay, Mozambique, Sudáfrica, España y Estados Unidos, produciendo contribuciones sustantivas en tres áreas: (1) conocimientos ecológicos locales y prácticas cotidianas con la fauna; (2) transformaciones de las relaciones humano-animales en contextos de conservación, desarrollo rural y bioseguridad; y (3) regímenes de gobernanza que articulan ciencia, política y sociedad en escenarios de conflicto ambiental. He publicado en revistas internacionales de alto impacto, editado dossiers y libros, y participado como investigador o responsable en proyectos financiados por agencias nacionales e internacionales. Mi trabajo ha sido reconocido mediante invitaciones a impartir conferencias, colaborar con organismos públicos y contribuir a evaluaciones globales de biodiversidad.

He liderado equipos de investigación, coordinado actividades de campo en varios países y dirigido tesis de grado, maestría y doctorado. Mi experiencia incluye la creación y consolidación de grupos interdisciplinarios en Uruguay, así como la formación de jóvenes investigadores en métodos cualitativos, análisis socioambiental y enfoques multiespecie. También he desarrollado vínculos con instituciones públicas responsables de fauna, salud animal, conservación y gestión del territorio, generando informes técnicos, diagnósticos y recomendaciones de política que han sido utilizados por ministerios y agencias nacionales.

La línea de investigación que propongo profundiza esta perspectiva comparativa y multiescalar analizando cómo diferentes sociedades enfrentan tensiones entre conservación, producción, riesgo sanitario y bienestar animal. Mi objetivo es comprender cómo se configuran las relaciones multiespecie en contextos de alta conflictividad [por ejemplo, fauna invasora, enfermedades transmitidas por animales, transformación de paisajes o implementación de tecnologías de control] y cómo estas relaciones informan nuevas formas de gobernanza socioecológica. La propuesta busca articular etnografía, análisis de políticas, comparación internacional y herramientas digitales aplicadas al estudio de paisajes, movilidad y prácticas de manejo ambiental.

Con ello, aspiro a consolidar un programa de investigación innovador, interdisciplinario y con impacto social, capaz de contribuir al debate científico internacional y de generar evidencia útil para la toma de decisiones en contextos de incertidumbre ecológica y desigualdad socioambiental.

Resumen del Currículum Vitae:

Mi trayectoria se ha construido desde una formación internacional en antropología y estudios socioambientales desarrollada en Uruguay, Brasil y España, y consolidada posteriormente mediante estancias y colaboraciones en Reino Unido, Estados Unidos, el sur de África y Europa. Este recorrido formativo ha sustentado una agenda comparativa que integra antropología ambiental, estudios multiespecie y análisis de políticas socioecológicas, orientada a comprender cómo distintos actores [comunidades rurales, agencias públicas y organismos internacionales] interpretan y regulan las relaciones entre humanos, animales y paisajes. Una sublínea sostenida de mi trabajo aborda los conocimientos ecológicos locales, los procesos de patrimonialización y las dimensiones simbólicas y afectivas que configuran las prácticas ambientales y su historicidad, nutriendo una perspectiva relacional y situada.

He producido alrededor de 95 publicaciones (55 artículos, 33 capítulos, 2 libros, 6 obras editadas), con presencia en revistas Q1 como Geoforum, Biological Conservation, Journal of Rural Studies, International Journal of Heritage Studies y Conservation & Society. Como IP he liderado ocho proyectos competitivos en Uruguay y he integrado equipos internacionales financiados por el U.S. Department of State, la National Science Foundation y la FAO. Mis estancias académicas y redes colaborativas en Reino Unido, España, América Latina y Estados Unidos han reforzado mi capacidad para articular enfoques interdisciplinarios y comparar escenarios sociopolíticos diversos.

En el ámbito ciencia-política destaco mi rol como Lead Author en dos evaluaciones globales del IPBES y mi participación en el Liaison Group IPBES-UNESCO sobre conocimientos indígenas y locales, contribuyendo a metodologías de diálogo de saberes y marcos analíticos para la toma de decisiones en biodiversidad a escala global.

Mi trayectoria incorpora una fuerte dimensión de transferencia y trabajo con usuarios finales. He asesorado a ministerios, agencias ambientales y organizaciones civiles en temas de caza, tráfico de fauna, bienestar animal, zoonosis, gestión del agua y gobernanza territorial. He organizado talleres intersectoriales, coordinado actividades de cocreación en Sudáfrica y desarrollado herramientas participativas con comunidades rurales. Mi investigación ha tenido también amplia difusión pública, con más de quince entrevistas y notas periodísticas en medios nacionales.

En formación de recursos humanos, he dirigido tesis de grado y posgrado y actualmente tutorizo cinco tesis doctorales en Uruguay y España. He diseñado e impartido cursos sobre antropología ambiental, métodos cualitativos, gobernanza socioecológica y estudios multiespecie. A ello se suma



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

mi actividad editorial y evaluadora, con más de cincuenta arbitrajes para revistas internacionales y participación en comités de evaluación de proyectos y personal científico. Mi perfil combina producción científica de impacto, liderazgo en equipos interdisciplinarios, articulación ciencia-política y un compromiso sostenido con la formación y la transferencia de conocimiento.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: MANGANELLI MANGANELLI, ALESSANDRA
Referencia: RYC2025-055209-I
Correo Electrónico: amanga1512@gmail.com
Título: From Hybrid Food Governance to the Food-Climate nexus in cities: a research trajectory and its future developments

Resumen de la Memoria:

Holding a double PhD in Urban Planning and Human Geography (Katholieke Universiteit Leuven and Vrije Universiteit Brussel, Belgium, 2019), I consider myself an interdisciplinary social scientist whose work primarily focuses on hybrid governance, social innovation, urban food planning, urban climate governance, and urban experimentation. My key contribution to the scientific community has been the development of a novel theoretical framework on the hybrid governance applied to urban food systems (see Manganelli, 2020, 2022; Manganelli & Moulaert, 2019, 2018; Manganelli et al, 2019). (Re)theorizing hybrid governance under a socio-political lens has allowed me to foster a sound conceptualization of the hybridity and multi-scalarity of actors, organizations, institutions, and forms of governance, in which urban food movements (and other sustainability transition movements) operate. Informed by this framework, I developed my research in an international arena, documenting governance challenges faced by urban food security initiatives across Europe and North America. This has allowed me to gain international visibility and influence within the fertile research community on urban food planning and within EU policy networks (see also my CV summary).

My second research agenda deals with urban experimentation, looking at the role and impact of urban climate experiments in European cities. Within the prestigious DFG Research Training Group "Urban Future-making" (2022-2025) at HafenCity University Hamburg, Hamburg University, and the Technical University of Hamburg, I have been leading research on urban experiments including nature-based solutions, mobility innovations, and public space interventions across European cities. This work adopts an interdisciplinary approach, combining urban planning, human geography, and social innovation studies, to critically assess how these experiments can challenge entrenched power structures and foster transformative, socially equitable urban change. By combining rigorous fundamental research with the development of policy-relevant insights, my work seeks to advance theoretical understanding while informing strategies for more sustainable and equitable urban futures (see Manganelli, 2024a,b; Grubbauer, Manganelli & Volont, 2024; Battisti, Cuomo & Manganelli, 2024; Manganelli & Battisti, 2025). This research is housed in an interdisciplinary research program on "Urban Future-making", which cross-fertilizes reflection-oriented disciplines (sociology, political science, geography) with solution-oriented disciplines (architecture, planning, engineering) of the built environment. By contributing to acquire funding for this program (around 7.300.000,00€ mobilised), I successfully supported the consolidation of a research group and the co-building of a research agenda on major urban transformation challenges of our time.

In the years to come, my research agenda aims at combining an urban food systems with an urban climate governance lens. This means analysing lock-ins and contradictions in achieving greater justice through socially innovative action in the food-climate nexus. Applying for national and EU funding schemes, my ambition is to become the PI of a dynamic research group investigating the role of collective action in contemporary socio-ecological justice transitions.

Resumen del Currículum Vitae:

My doctoral and postdoctoral years served the purpose of developing quality scientific outputs, building internationalisation and visibility, shaping my independent scholarly profile, and strengthening my leadership skills. In terms of scientific production, I have published my research in highly ranked international peer-reviewed journals with high impact factors. Five main single-authored and first-authored articles have appeared in Local Environment, Land Use Policy, Territory, Politics, Governance, the Journal of Environmental Policy and Planning, and Canadian Food Studies. Four additional papers from my second research line have been published in Urban Geography, Environment and Planning C, Territory, Politics, Governance, and the Urban and Regional Studies Archive. I have also published a monograph with Springer (Manganelli, 2022) and co-edited a volume with Monika Grubbauer and Louis Volont for transcript Verlag, further advancing and disseminating my contributions to hybrid governance and the field of urban future-making.

With respect to internationalization and visibility, my career has developed in 5 countries - Belgium, Germany, Canada, Italy, Spain - where I performed visiting research stays (Canada, Italy, Spain), research positions and grant acquisitions (Belgium, Germany, Spain), further collaborations in publications, conferences, and scientific development. Thanks to my scientific contribution in the field of urban food movements and socio-ecological transformations, I am nowadays recognized as a leading expert in Urban Food Planning, a trans-disciplinary community of scholars and professionals engaged in the challenge of shaping urban sustainability and equity through the lens of food systems.

In terms of leadership skills and capacity to mobilize funding, I have been trained to obtain grants autonomously and raise funds in two different countries since the early stages of my research career. I raised funds to finance my own PhD through the Flemish Research Foundation FWO (approx. 86,400€); I engaged in obtaining funding for a research training program with pathbreaking contribution on fundamental research through the German Research Foundation DFG (approx. 7.300.000,00€).

Believing in science-to-policy and science-to-society transfer, I have collaborated as scientific expert with the EU Committee of the Regions (2019-2021); I have become partner and action leader in the EU Urban Agenda partnership on Food (2023-currently); I have been elected as chair of the AESOP Sustainable Food Planning group. Moreover, I have been constantly divulging my research through scientific platforms (participation to numerous international conferences), public workshops, popular seminars, research practices dialogues.

I have been invited as a guest lecturer in several institutions, including IMSDP - International Module Spatial Development Planning (a.y. 2020-2021, 2023-2024); the Faculty of Community services of the Toronto Metropolitan University (November 2023); the Parsons School of Design (New York, November 2023, 2024). I have experience in Bachelor and Master thesis co-supervision (#12), PhD Mentoring (#12), and PhD evaluation (#3).



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

In the years to come, I aim at gaining further leadership by committing to be main investigator fostering high quality research on collective action and its link to sustainability and justice.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: MATTALIA, GIULIA
Referencia: RYC2025-054563-I
Correo Electrónico: giuliamattalia@ub.edu
Título: Leveraging cultural keystone species and embedded stewardship practices for biodiversity conservation
Resumen de la Memoria:

I am an ethnobiologist whose work illuminates the dynamic relationships linking Indigenous and local knowledge holders, biota, and environments through an interdisciplinary lens.

Since 2011, my research has centred on understanding how local plant knowledge evolves, persists, or erodes across diverse cultural and ecological contexts—including cocoa-farming communities in the Dominican Republic, the Hutsul people of the Carpathian Mountains (ERC DiGe), and multiple ethnolinguistic groups in Italy. By integrating anthropology, botany, and ecology, I have developed new ways of conceptualising the social and ecological drivers shaping human–plant relations and the implications for safeguarding biocultural heritage.

Since joining the ERC LICCI project at ICTA-UAB in 2019, I have broadened my research to examine Indigenous and local knowledge holders' perceptions of environmental change and its drivers. In 2022, I was awarded an international postdoctoral fellowship (Margarita Salas) at the New York Botanical Garden and ICTA-UAB to innovate the use of Cultural Keystone Species as an ethnobiological tool for biodiversity conservation. Following a postdoc at the Institut méditerranéen de biodiversité et d'écologie in Marseille, France, I obtained a Marie Skłodowska-Curie Global Fellowship. I joined the Universitat de Barcelona as profesora lectora to continue my investigation on stewardship practices that sustain plant biodiversity.

My long-term, field-based collaborations with Indigenous and local knowledge holders across several countries have contributed to three areas: identifying factors that shape plant knowledge dynamics; documenting the knowledge systems of understudied ethnolinguistic minorities; and demonstrating the significance of Indigenous and local ecological knowledge and practices for understanding climate change and advancing biodiversity conservation. This work has generated 64 peer-reviewed publications, two book chapters, and over 1,500 citations (H-index 20) and has been disseminated through 20 presentations across four continents.

My project would aim to explore the concept of “cultural keystone species” -species of exceptional cultural significance to a specific sociocultural group- and the embedded stewardship practices as global biocultural tools to inform biodiversity conservation. Biodiversity conservation initiatives often neglect the environmental stewardship of Indigenous Peoples and local communities, thereby contributing to undesirable ecosystem shifts and biodiversity loss. To mitigate the biodiversity crisis, novel approaches propose expanding conservation initiatives beyond biological diversity to include local values, culture, knowledge, and beliefs. The concepts of “cultural keystone species” and stewardship practices have the potential to inform and shape local biocultural conservation initiatives, although their use in conservation is still limited. Therefore, I will explore the operationalization of this concept through an interdisciplinary and intersectoral project that will consolidate my leadership in ethnobiology for conservation. The project will be conducted in collaboration with two Indigenous peoples and local communities.

Resumen del Currículum Vitae:

Education

- ☐ Double PhD in Environmental Sciences (Ca' Foscari University of Venice, Italy & Universitat Autònoma de Barcelona, Spain, 2018–2021; defended 2022)
- ☐ Double MSc in Agroecology and Organic Agriculture (Wageningen University, The Netherlands & ISARA Lyon, France, 2014–2016)
- ☐ BSc in Gastronomic Sciences (University of Gastronomic Sciences, Italy, 2010–2013)

Professional Experience

4-year experience as a postdoctoral researcher at:

- ☐ IRD French National Research Institute for Sustainable Development, Marseille, France (Jan–Sept 2025)
- ☐ ICTA-UAB Universitat Autònoma de Barcelona, Spain (Dec 2022–Dec 2024), including a year at New York Botanical Garden, USA
- ☐ Ca' Foscari University of Venice, Italy (Sept 2021–Dec 2022), with stays at University of Guelph, Canada, and Uppsala University, Sweden.

20-month experience as research collaborator, University of Gastronomic Sciences (2017–2018)

6-month experience as field researcher, The Forest Trust, Dominican Republic (2016)

Key Contributions

I co-authored 62 publications in indexed peer-reviewed journals and two book chapters on topics such as:

- ☐ Biocultural diversity and ethnobotanical knowledge
- ☐ Cultural keystone species as tools for stewardship
- ☐ Climate change impacts on socio-ecological systems
- ☐ Sustainable foraging and agroforestry
- ☐ Governance and sovereignty of biodiversity use data
- ☐ Ethnoecology of fishing and pastoral communities

Most of my publications are the result of international collaborations with researchers across Europe, the Americas, Asia, and Africa.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

As an educator, I have lectured at bachelor's, master's, and doctoral levels in three countries and co-supervised a PhD alongside numerous graduate and undergraduate researchers in Spain (UAB and UB), Italy (UNIVE and UNISG), and the USA (Columbia University).

I served the academic community as a reviewer for 27 journals, an evaluator for the EU Biodiversa+ programme and the Hungarian Research Office, an editorial board member for two ethnobiological journals, and a guest editor for leading interdisciplinary outlets. I have presented my work at 20 international scientific events since 2019.

I received multiple international awards. Here I select some.

- ☐ Marie Skłodowska-Curie Global Fellowship (EU, 2025)
- ☐ PhD Extraordinary Thesis Award (UAB, Spain, 2024)
- ☐ São Paulo School of Advanced Studies workshop grant (FAPESP, Brazil, 2024)
- ☐ Maria de Maetzu grant for fieldwork (ICTA-UAB, Spain, 2023)
- ☐ C.M. Leric Visiting Researcher grant (CM Leric Fund, Sweden, 2022)
- ☐ Erasmus Training Scholarship (EU, 2022)
- ☐ Institutul Cultural Român foreign research award (ICM, Romania, 2019)
- ☐ Bando Cassini Junior (French Embassy in Italy, 2019)
- ☐ Travel Grant (Society for Economic Botany, USA, 2019)

I conducted fieldwork for more than 18 months across six countries in Europe and the Americas.

I currently coordinate an international team of Indigenous collaborators, practitioners, and scholars advancing global research on cultural keystone species and stewardship practices. My career is sustained by extensive international partnerships across Europe and the Americas, competitive grants, and a commitment to weaving together Indigenous/local and Western knowledge to achieve more just and resilient biodiversity futures.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: BERTI, CARLO
Referencia: RYC2025-054841-I
Correo Electrónico: carlo.berti@gmail.com
Título: Journalism Studies and Political Sociology

Resumen de la Memoria:

During my PhD studies, I focused mainly on corruption and, as a research assistant, on election campaigns in New Zealand. Subsequently, as a postdoctoral researcher first at the University of Trento, then at the Universitat Rovira i Virgili, and finally at Charles University, I worked on European Union politics and institutions, focusing on populism. My focus gradually shifted from the centre of the EU (Brussels and the European Parliament) to more peripheral areas (particularly Spain, Italy, and Hungary). At the same time, I moved from researching communication produced by European institutions to studying the complex relationship between journalism and far-right populism, with particular reference to issues of press freedom. However, my research trajectory has been characterised by certain constant elements. First of all, the interdisciplinary nature of my studies. Starting from a background in journalism and communication studies, I have ranged between political sociology, political science, and some more specialised fields such as corruption studies and European Union politics. Secondly, my research is characterised by the use and analysis of discourse, whether institutional discourse, journalistic content, social media content, or transcripts of semi-structured interviews. I have therefore developed extensive experience with text and discourse analysis methodologies (e.g. framing analysis, content analysis, critical discourse analysis). I have also always sought to use a mix of quantitative and qualitative methods. Finally, my research is characterised by a deep interest in understanding how discourse, through the choice of content, frames, multimodality, and other relevant elements, influences the perception of certain issues (e.g. corruption, migration, journalism) and, consequently, social attitudes and behaviours, as well as policies (at local, national, or supranational level). In particular, in recent years (since 2022), my work has focused on how journalism relates to the populist far right in the European Union. I have investigated these issues at both the EU and the national level, particularly in Spain and Italy. More recently, however, my focus has shifted to journalism at the local level. The relationship between local journalism and far-right populism has been little researched, but it is highly relevant given the growing weakness of local journalism (news deserts, precariousness, scarce resources). In particular, I have launched an innovative line of research on media representations of human-wildlife coexistence, focusing on bears. I have published two open-access academic articles on this topic in prestigious journals (Poetics and Cambridge Prisms: Extinction). During the RYC, I would like to explore this topic further, using a comparative approach and collaborating with the media to improve communication on human-wildlife coexistence. At present, I have already begun collaborating with Prof. Douglas Clark (School of Environment and Sustainability, University of Saskatchewan, Canada), Prof. Roberta Raffaetà (The New Institute Centre for Environmental Humanities, University of Venice, Italy), and the local newspaper Il Dolomiti (located in Trentino, Italy, where human-bear coexistence is highly conflictual).

Resumen del Currículum Vitae:

I have published 16 articles in peer-reviewed journals, 6 book chapters for international publishers, 1 edited volume and 1 popular science book in Italian. I have participated in numerous national and international conferences, presenting my findings at prestigious events. Since 2021, I have been a member of the board of Research Network 32 - Political Sociology of the ESA. During my academic career, I have obtained numerous competitive grants from various organisations. In 2014, I was awarded the AUT Vice-Chancellor's Doctoral Scholarship. In 2018, I obtained a grant-funded position in the prestigious Schuman Traineeship Programme, working for five months (09/2018 to 01/2019) in the Cabinet of the President of the European Parliament (Communication Team). In 2021, I was awarded a "María Zambrano" grant for the attraction of international talent. In 2023, I obtained an "MSCA Fellowship CZ - UK2", funded by the Czech Ministry of Education, Youth and Sport and co-funded by the European Union. I am currently completing this research project as principal investigator at Charles University in Prague. In May 2025, I obtained a grant within the "UAAT International Young Visiting Scholar Programme", funded by the University Academic Alliance of Taiwan. The grant funded a five-week visiting scholar position at National Chengchi University in Taipei. Throughout my academic career, I have participated in several projects as a member of a research team, and in two projects as principal investigator. I have gained research experience mainly in the fields of political communication and journalism studies, with a focus on the European Union and its institutions, and on populism. More recently, I have embarked on a parallel research path on the sociology of human-wildlife interactions, focusing on media coverage of bears in various contexts. I have published two articles on this topic in prestigious journals, and I recently submitted a research proposal jointly with the University of Saskatchewan, the University of Venice, and the Italian newspaper Il Dolomiti. I have extensive expertise in methodologies such as quantitative and qualitative content analysis, critical discourse analysis, framing analysis, and semi-structured interviews. As part of my communication activities, I published two articles for the online outlet The Conversation (in 2019 and 2022), and one for the major New Zealand newspaper The New Zealand Herald (in 2017). In 2024, together with a judge, I published a popular science book on corruption (in Italian). Between 2019 and 2024, I designed and taught several courses in Italian, Spanish, and English. I am a member of the editorial committee for the book series "Cantiere delle Idee" for the Italian publisher Castelvetti. I conducted peer reviews for several international journals. I am fluent in Italian, English and Spanish, and have a basic knowledge of German, Catalan and Czech. I have a good knowledge of SPSS and NVivo software, and an excellent knowledge of Atlas.ti. I have an Associate Professor accreditation (acreditació de recerca) issued by AQU in 2024.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: DE CARVALHO, GABRIELA
Referencia: RYC2025-055367-I
Correo Electrónico: gabrieladecarvalho@icloud.com
Título: Policy Design, Institutional Architecture, and Social Stratification in Social Policy

Resumen de la Memoria:

My research examines how welfare state institutions and social policies are designed and how they produce social stratification through differential access to services. It develops across three interconnected lines that combine conceptual, methodological, and empirical contributions to comparative social policy.

The first line analyses how international organisations shape social policy development, especially in the Global South. This work has demonstrated how actors such as the World Bank, the World Health Organization, and the Economic Commission for Latin America and the Caribbean (ECLAC) influence healthcare and long-term care reforms through the diffusion of policy models, and how domestic conditions mediate their adoption. A core scientific contribution is an actor-centred typological framework that incorporates global actors alongside state, market, and societal institutions into the classification of healthcare systems, addressing long-standing limitations of welfare typologies derived from high-income contexts.

The second line focuses on institutional segmentation as a mechanism of welfare inequality. A central output is the Global Historical Healthcare Systems Dataset (G2HSet), which I led from design to final documentation. Covering 165 countries from 1880 to 2020, it is the first global dataset to trace the historical introduction and institutional configuration of healthcare systems. In parallel, I co-founded and edited the CRC Social Policy Country Briefs Series, which provides structured and systematic documentation of social policies across countries. It now comprises more than 50 reports authored by scholars from five continents.

The third, emerging line examines how family policies structure access to social services and shape labour market inequalities across diverse household configurations. This work conceptualises how policy rules interact with family characteristics such as employment, administrative status, disability, and lone parenthood to create cumulative (dis)advantages. Early contributions include a comparative analysis of childcare service generosity and the co-leadership of a correspondence experiment on hiring discrimination in the context of parental leave reforms in Spain.

Across these lines, my publication record includes articles in leading Q1/Q2 social and public policy journals (Global Social Policy, Policy Studies, Contemporary Politics, Social Inclusion), four book chapters, a public dataset, and multiple technical and working papers. Many outputs are first- or corresponding-authored, reflecting a consolidated level of scientific independence. I have presented my research at major international conferences, including the ISA Forum of Sociology, the European Consortium for Political Research (ECPR), the European Consortium for Sociological Research (ECSR), the International Conference on Public Policy (IPPA) and ESPAnet. I have also delivered invited talks at universities in Europe and Latin America. My work also extends beyond academia: I have worked as consultant for the World Health Organisation and the World Bank, producing analytical reports and policy reviews for European governments.

Resumen del Currículum Vitae:

My academic trajectory is multidisciplinary and international, spanning training and research experience in Brazil, the UK, Spain, and Germany. I hold a PhD in Economics and Social Sciences from the University of Bremen (magna cum laude), following earlier degrees in international relations, development, and political science at prestigious universities such as King's College London, the University of St Andrews, and the Autonomous University of Barcelona. My work focuses on comparative social policy, with particular attention to how welfare institutions shape access to services and generate social stratification.

I have consolidated an independent research profile through competitive funding acquisition, project leadership, and international collaboration. I am currently Principal Investigator of a Marie Skłodowska-Curie Postdoctoral Fellowship and co-PI of a Spanish Ministry of Equality research project; previously, I led a University of Bremen project and held a Juan de la Cierva fellowship. I also contributed as Work Package leader to the €15M German Research Foundation-funded Global Dynamics of Social Policy project (CRC 1342) and remain affiliated to this research centre. Across my trajectory, I have participated in ten externally funded projects, including three as PI/co-PI and two as named co-applicant.

My publication record includes 21 outputs, comprising six peer-reviewed journal articles, four book chapters, a public dataset, and several working papers, with additional manuscripts under review. My work appears in leading social policy and public policy journals. All my peer-reviewed articles and book chapters are open access, and my main dataset is publicly available, reflecting a strong commitment to open science.

My international engagement includes collaborations with researchers at the University of Cambridge, City University of New York, the University of Inland Norway, the University of Havana, the University of Milan, and the Universidade Federal do Rio de Janeiro. I have undertaken a research stay at the University of Cambridge (2025) and have organised five international workshops, in addition to regularly presenting my work at international conferences.

I have also developed substantial experience in policy-oriented research. Since 2022, I have collaborated with WHO Europe on projects related to the development of public health policies. I have also served as a consultant for the World Bank, preparing and presenting a policy report on support measures for informal caregivers in European countries.

My teaching and mentoring record includes co-supervision of an FPI-funded PhD student, supervision of Master's theses, guidance of research assistants, and teaching qualitative and quantitative methods at BA and MA levels. I am active in academic service, including seminar organisation, journal reviewing, and editorial responsibilities. My academic achievements have been recognised through excellence awards at the PhD and master's levels, as well as competitive scholarships and fellowships supporting research training and mobility.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: RINCÓN GARCÍA, LEIRE
Referencia: RYC2025-054310-I
Correo Electrónico: leiremaria@gmail.com
Título: Advancing an Independent Research Profile on the Politics of Inequalities: Welfare Reform, Political Participation, and Gender-Based Violence

Resumen de la Memoria:

I am a political scientist specialized in political behaviour and quantitative methods, with an interest in different forms of inequality. My trajectory demonstrates clear scientific independence, with two projects as PI or co-PI (La Caixa Social Research 2024 and Flash Call 2025, both with 4% success rates), 10+ publications with frequent first- or sole-authorship, and recognition through multiple awards. I have raised €160,000 in competitive funding, produced original datasets, and contributed to over ten national and international research projects. My work informs public debates and policy processes on welfare reform and gender-based violence and is used by governmental and non-governmental institutions.

My research trajectory is structured around three independent lines of inquiry, all underpinned by a common interest in different forms of inequality. The first examines the politics of welfare-state reform, with a central focus on public support for Universal Basic Income (UBI). Motivated by the puzzle of why support remains limited despite viable proposals, I designed one of the first cross-policy conjoint experiments comparing UBI with realistic alternatives. My work shows that support for UBI is multidimensional and generally overstated when trade-offs are considered, while also demonstrating how design and contextual factors shape preferences. This line has expanded to broader questions of policymaking dynamics and framing, and has been validated by other scholars who adopted my methodological approach. Its contribution has been recognised through publication in leading journals—including a highly cited solo-authored article in JEPP—and awards such as the POLEXP Prize for Best Experimental Design.

My second line of inquiry investigates a fundamental paradox: the rise of gender-based violence (GBV) in societies that exhibit increasing gender equality. Theoretically, I argue for analysing all forms of GBV jointly and show that uneven shifts in gender norms are key to understanding its prevalence. Empirically, I developed the first centralised dataset of GBV indicators and an innovative survey instrument capable of identifying violence even when victims do not label it as such. This work led to major recognition, including being awarded the La Caixa Social Research grant as the youngest PI and receiving the Nativitat Yarza Prize for feminist research.

The third line explores inequalities in political participation and democratic responsiveness. I study who participates, which forms of engagement they choose, how interest groups gain access, and to what extent political elites respond to different actors. A key contribution is my coordination of Spain's first comprehensive database of interest groups, now widely used to analyse representation biases. Much of this work has been embedded in national and international teams, including an ERC project on political participation.

My research trajectory has been shaped by sustained international exposure, with over five years of experience abroad, research stays at Oxford and the Mannheim Centre for European Social Research, and collaborations with over 20 scholars from 8 different institutions. These experiences have been instrumental in shaping me into an independent scholar capable of generating high-impact research.

Resumen del Currículum Vitae:

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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: FLORIDI, GINEVRA
Referencia: RYC2025-054206-I
Correo Electrónico: ginevrafloridi@gmail.com
Título: Families, intergenerational support, and social inequality

Resumen de la Memoria:

My research trajectory has evolved along four lines of investigation: families and intergenerational transfers; demographic research and methods; population ageing and policy; and the development of measurement tools. All these research lines are related to my interest in families and inequalities. My recent work develops theoretical and empirical insights about how transfers of money and living space from parents to young adult children reflect and reproduce inequalities. It has been funded by a Postdoctoral Prize Research Fellowship at Oxford University and British Academy seed funding. In forthcoming work, I analyse 170 years of census data on living arrangements in the United States, and question notions about the historical predominance of so-called "nuclear families". In previous work, I have used quantitative methods to highlight and explain inequalities in COVID-19 mortality, access to long-term care, and its effects on health by socio-economic status, gender, and ethnicity. My work highlights the role of local and national policies for mitigating inequalities. I have also contributed to methodological development by proposing a new method for eliciting statistical weights for indicators in composite measures.

My career is distinguished by international collaboration and mobility. Since my PhD at the London School of Economics (2015–2019), I have obtained funding and support for research visits including to Seoul National University in 2017, the Center for Demographic Studies in Barcelona (2023, 2024, 2025), Yale University in 2025, and the European University Institute (planned for May–June 2026). Despite the cancellation of my planned visit to the Technical University Dortmund in 2020 due to the COVID-19 pandemic, I fostered internationalisation within the project I was working on, organising online seminars and leading on two cross-institutional publications. I regularly attend international demography and sociology conferences, and I contribute to organise British Society for Population Studies meetings.

I have demonstrated independence and leadership throughout my career. I have secured funding from the Economic and Social Research Council (PhD studentship and Advanced Quantitative Methods award); Nuffield College at the University of Oxford (Postdoctoral Prize Research Fellowship); the Oxford University Press John Fell Fund; and the British Academy/Leverhulme Small Grant. I have led or solo-authored eight published and two forthcoming papers in high-ranking journals including Demography, Social Forces, and the Journals of Gerontology. I regularly mentor research assistants and PhD students.

As a Ramón y Cajal fellow, I plan to develop two lines of research about intergenerational family transfers. First, adopting a sociological lens and analysing cohort survey data from Europe and the United States, I plan to test a life course model by which economic transfers from parents to children arise unequally across socio-economic groups, and reproduce inequalities in employment, family formation, and later-life health. Second, adopting a demographic perspective, I plan to devise novel population-level indicators of intergenerational support, and study their variation across space and time, particularly in relation to policy contexts.

Resumen del Currículum Vitae:

I am a social demographer with expertise in demography, sociology, and statistics. Since 2023, I am a Lecturer in Sociology and Quantitative Methods at the University of Edinburgh in the United Kingdom (UK). Before then (2021–2023) I held a Postdoctoral Prize Research Fellowship at Nuffield College, University of Oxford, which funded my independent research project. Between 2019 and 2021, I worked as postdoctoral research associate at King's College London as part of the international IN-Care (Inequalities in Care) project. In 2019, I was awarded a PhD in Demography from the London School of Economics and Political Science (LSE), funded by the Economic and Social Research Council.

I use quantitative methods to analyse international surveys and administrative data, highlighting differences across areas and structural change over time. My research interests span Europe, the US, South Korea, and Mexico. I have published research on intergenerational transfers in Social Forces and Sociological Science; on demographic phenomena including living arrangements and COVID-19 mortality in Demography and PNAS; on population ageing and policy in the Journals of Gerontology, Ageing & Society, and European Societies; and proposed a new measurement method, published in the Journals of the Royal Statistical Society. All my publications are open access, replicable, and compliant with data ethics principles. I have also led the development and dissemination of an open-access data resource on homicide rates across Mexican municipalities. I have been invited to present my research at venues including University College London and St. Andrews University in the UK, Yale University in the US, and the Center for Demographic Studies in Barcelona. I regularly attend conferences such as the Population Association of America, the European Population Conference, and the European Consortium for Sociological Research. My research has appeared in policy reports and stakeholder meetings, and I engage in collaborative dissemination with non-governmental organisations, such as the Resolution Foundation in the UK.

My research has received competitive funding, including from a Postdoctoral Prize fellowship at Oxford (around 120,000 GBP); the British Academy/Leverhulme Trust (10,000 GBP); and the Oxford University Press (8,500 GBP). Thanks to this funding, I have worked with several research assistants at the Universities of Oxford and Edinburgh, supporting their career development and independence, and contributing to their training in methods for survey research. I currently supervise four PhD students, of which one at the Centre for Demographic Studies in Barcelona, navigating cross-institutional collaboration and administration. At Edinburgh, I teach courses in statistics and social demography. I am the Director of Tutor Development, overseeing the training of 140 teaching assistants in social science courses.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I am in the editorial board of the European Journal of Ageing, and a regular reviewer for over 20 academic journals. I contribute to the evaluation of grants including for the European Research Council. I collaborate with researchers based across Europe and North America, including the European University Institute, Yale University, North Carolina State University, and the Center for Demographic Studies in Barcelona.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: KUCUKUSTEL BANK, SELCEN
Referencia: RYC2025-055526-I
Correo Electrónico: selcenustel@gmail.com
Título: Ecological anthropologist

Resumen de la Memoria:

My research trajectory is profoundly international, interdisciplinary, and grounded in long-term ethnographic engagement across Siberia and the Amazon. After completing an MA in social anthropology in Türkiye, I earned my PhD in Central Asian Studies at Humboldt University of Berlin, where I developed expertise in Indigenous ontologies, hunting rituals, and human-environment relations among the Dukha reindeer herder-hunters of northern Mongolia. Following my doctorate, I taught at Bahçeşehir and Yeditepe Universities in Istanbul before joining the ERC project Rivers & Water/Human Rights Beyond the Human? at Carlos III University of Madrid. There, I led research on Indigenous water ontologies in Nepal, collaborating with global experts in political ecology and Indigenous rights, and co-organized an international conference on the Rights of Nature.

My postdoctoral trajectory further expanded my geographical and theoretical scope. In 2022, I joined the Research Group on Indigenous and Afro-American Cultures (CINAF) at the University of Barcelona, initiating extensive fieldwork with the Ticuna in the Colombian Amazon and engaging deeply with Latin American scholarship through the Medios Indígenas Lab. This period strengthened my comparative research linking Asia and Latin America and culminated in my participation in the "Alter-ecologías" seminar and contribution to the Alterecologies special issue in Theorizing the Contemporary (Cultural Anthropology).

A subsequent research stay as a visiting scholar at the National University of Colombia (Amazon campus) broadened my focus on hunting ontologies into a new line examining human-plant relations. Building on these experiences, I developed a feminist perspective on Indigenous ontologies, which was recognized through a Marie Skłodowska-Curie Fellowship for my project ECOFEMINDI at the University Institute of Lisbon. During this fellowship, I have been integrating feminist anthropology with multispecies ethnography, collaborating with leading scholars, and expanding my methodological expertise in collaborative and multimodal anthropology.

Across these stages, my research has examined how Indigenous communities conceptualize and relate to nonhuman beings—rivers, animals, spirits, and landscapes—and how these relations shape rights, knowledge, gender, and environmental governance. My work follows two interconnected lines: the development of multimodal, sensory, and participatory methodologies for more-than-human ethnography; and a comparative investigation of Indigenous ontologies across Siberia and Amazonia, with an emerging emphasis on feminist perspectives and decolonial pedagogies. Overall, my publications, international collaborations, and visual productions reflect a sustained commitment to understanding and representing multispecies worlds in their political, ethical, and ecological complexity. I have led the conceptual development of several theoretical contributions (e.g., nurturing control in domestication, wildernization, landscape elicitation) and received invitations to present my work at prestigious institutions. At the moment, as part of my Marie-Curie fellowship, I am writing a methodological paper about the usage of camera and how it leads to sensory observations in the field.

Resumen del Currículum Vitae:

I am a social anthropologist with a strong international research trajectory, developed across Germany, Türkiye, Spain, Portugal, and Colombia. My work centers on ecological anthropology, multispecies ethnography, visual anthropology, Indigenous communities, political ecology and, ecofeminism. I combine long-term multi-sited ethnography (fieldwork in Mongolia, Nepal, Colombian Amazon, Republic of Congo) with interdisciplinary collaborations, multimodal methodologies, and public-facing research outputs. In parallel to my academic career, I have been working as a photojournalist, editor, and documentary filmmaker, producing research-driven visual work for prestigious media outlets such as ARTE and DW.

I am currently a Marie-Curie Postdoc Fellow at the University Institute of Lisbon, developing an independent research line on Indigenous women's ecological knowledge in Amazonia and Siberia. This project brings an ecofeminist and more-than-human perspective to political ecology, examining how gender shapes relations with nonhuman beings and forms of environmental stewardship. This builds on my long-standing research on multispecies ethnography, and spirited landscapes. My doctoral work at Humboldt University of Berlin focused on the Dukha reindeer herder-hunter community in northern Mongolia. Through eleven months of immersive fieldwork, learning indigenous language Tyvan and participating in daily practices and rituals. My doctoral dissertation resulted in the monograph Embracing Landscape: Living with Reindeer and Hunting Among Spirits in South Siberia, published in 2021 by Berghahn Books, a leading and highly respected press in the field of anthropology. I have also published articles in leading journals such as Journal of Political Ecology (Q1) and Society & Animals and Cultural Anthropology. My publication record demonstrates independence through single-authored outputs with prestigious publishers. Following my PhD, I held postdoctoral positions at Carlos III University Madrid in an ERC project and at the University of Barcelona, where I began new research in the Colombian Amazon. I have taught undergraduate, MA, and PhD students at Bahçeşehir University, Yeditepe University, Humboldt University, and Carlos III University, and supervised student projects. My research has been funded by major agencies including the European Commission and Turkish Research Council.

As part of my commitment to ethical research and responsible scientific practice, I have been actively involved in civil society and science communication. I co-founded Doga Okulu, a leading Turkish NGO advocating for nature rights, and have worked with Survival International a major international NGO working for Indigenous peoples' rights, as well as local NGOs in Mongolia and Colombia. Science communication is central to my work. In 2022, I joined colleagues from University College London in the Republic of Congo to document their British Academy-funded research with BaYaka hunter-gatherers, resulting in our co-directed film Rising in the Forest. I contributed photography and video from the Amazon to the exhibition



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Pensar Bonito at the Museo de América in Madrid. Within my Marie Curie project, I am developing an interactive multimodal website to share Indigenous ecological knowledge with wider audiences.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: CASTRO BAIA REIS, ANTONIO ALBERTO
Referencia: RYC2025-054525-I
Correo Electrónico: antoniocastrobaiareis@gmail.com
Título: Extended realities and generative AI in audiovisual narratives for science, heritage and social innovation
Resumen de la Memoria:

My research trajectory is situated at the intersection of audiovisual communication, immersive media, and creative, practice-based methodologies for science, heritage, and social communication. I have made pioneering contributions to immersive journalism, live theatre and performance in virtual reality worlds, and to the notion of "emotional geography" as a critical alternative to the idea of VR as an "empathy machine". These works, published in Q1-Q2 journals and reputable publishers, have consolidated an international profile that combines scientific and artistic production (journal articles, book chapters, books, XR prototypes, artistic works) with solid bibliometric indicators (h-index 7, i10-index 5, and over 350 citations in Google Scholar) and regular participation in leading conferences (ICA, ECREA, IAMCR, iLRN, Universeum, among others). In parallel, I have participated in and led competitive R&D projects - such as CONECTAR, 5GCREATIVEEXPLORER and DICI-EDUCA - where I apply immersive narratives and co-creation in vulnerable communities, linking academic research, social innovation, and knowledge transfer. This trajectory has enabled me to lead, as Principal Investigator, the Marie Curie project SCICOMMXR (Horizon Europe), which explores how XR-based media arts can transform science and heritage communication. Within this framework, I have designed and coordinated XR experiments in exhibition and museum contexts, fostering international collaborations (Portugal, Spain, Germany, United Kingdom, Czech Republic, Italy, France) and formal institutional agreements. My independence is further evidenced by my leadership of research lines and laboratories, supervision of doctoral and master's theses, and roles on editorial and scientific boards of international journals and conferences. The line of research proposed for this call builds on and extends this trajectory towards a critical challenge: the preservation and communication of endangered intangible cultural heritage in the Iberian region. Its core aim is to develop new audiovisual production models and narrative grammars that integrate generative AI (text-to-video, image, 3D, synthetic voice, large language models) and extended realities (VR, AR, MR, 360° video, immersive sound, spatial computing) to document, reconstruct, and communicate threatened practices, knowledges, and memories, especially in rural territories affected by depopulation. Methodologically, I combine ethnographic and documentary work with AI-driven and immersive production workflows, co-designed with heritage custodians, cultural institutions, and audiovisual professionals. The project will: (1) create and validate narrative grammars and tools for AI-based modelling of intangible heritage; (2) produce and evaluate immersive pieces that foster cultural empathy, intergenerational transmission, and accessibility; and (3) design a training and implementation framework for museums and local stakeholders. In doing so, it will advance critical, ethical and scientific understanding of AI+XR in heritage preservation and communication while providing concrete solutions to strengthen cultural sustainability and social cohesion in the Iberian Peninsula.

Resumen del Currículum Vitae:

António Baía Reis bridges research and creative practice in audiovisual communication, immersive media and extended realities (XR). He has developed pioneering frameworks for XR storytelling, "emotional geography" for VR's social impact, and human-AI co-creation, showing how emergent narratives combined with technology can foster empathy, cultural awareness and social change. As principal investigator of the Horizon Europe Marie Curie project SCICOMMXR he leads research using XR and generative AI to create new arts-based methods for science and heritage communication. His work has translated into technological innovation and societal impact. He has led and actively contributed to more than seven interdisciplinary R&D projects that apply immersive media narratives to real-world challenges. In SHAPINGII he coordinated immersive outreach in schools. In YML TWO he developed participatory digital communication and training resources between universities, industry and local ecosystems. In CPPS101 he led the design of an online course on Industry 4.0 and smart manufacturing. In CONECTAR he designed an interactive VR platform for patient and public involvement in asthma research, and in DICI-EDUCA he implemented participatory 360° storytelling with at-risk youth, evidencing how immersive media can empower marginalised communities. He co-founded XR initiatives for heritage and art (e.g. Cuarta Pared VR, Auzoux VR) and directs innovative culture projects at the University of Salamanca that combine XR and communication. Through collaborations with hospitals, schools, industry and cultural institutions, he has produced creative outputs in science communication, heritage preservation and social innovation. He regularly leads public workshops, teaches narrative-design courses for researchers, appears in national media, and has presented work in numerous international exhibitions (e.g. Venice Biennale, Cannes XR). His awards (iLRN Best Poster, Inmersiva XR Creative Concept, AstraZeneca prizes, among others) underline his impact as a researcher, mentor, academic leader and driver of public engagement. Baía Reis formally supervises multiple PhD and master's students internationally and has tutored research in emergent media and communication. In teaching roles, he coordinates courses (e.g. the undergraduate Photography Lab) and has led research groups and R&D initiatives such as the Future Media CoLab (University of Passau) and the XR Education Hub (Virtual Voyagers Academy and Complutense University of Madrid). His editorial activity is extensive: he is Editor-in-Chief and Director of Cinema & Território, serves on the editorial boards of Media Practice and Education and the International Journal of Performance Arts and Digital Media, and regularly reviews for leading international journals. His research includes book chapters and articles in high-impact indexed journals (Q1-Q2), with 353 citations (h-index 7, i10-index 5) and around 32 conference presentations in forums such as ICA, ECREA and IAMCR. He also contributes to industry and policy partnerships as a member of USAL's CRUCIAL knowledge-transfer group and as scientific advisor in the European Union Science Diplomacy Alliance, leading its task force at the University of Salamanca. These roles demonstrate his independence, leadership and broad impact across science, culture and soc



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: MINGORRIA MARTÍNEZ, SARA
Referencia: RYC2025-054616-I
Correo Electrónico: smingorriamartinez@gmail.com
Título: Socio-environmental transformations and conflicts: social inequalities, violence and collective resistance from an intersectional perspective

Resumen de la Memoria:

My research follows an intersectional and interdisciplinary approach that examines how gender, class and ethnicity shape socio-ecological transformations, political dynamics, and everyday experiences of inequality and resistance. I combine environmental and rural sociology, critical agrarian studies, ecological anthropology, human geography, political ecology, ecological economics, and feminist and gender studies. A distinctive feature of my work is the centrality of feminist and participatory action research methods and the co-production of knowledge with local communities and social movements, drawing on epistemologies from both the global North and South.

My work advances three interconnected lines of research: (A) social stratification, inequalities and territorial transformations; that many time involve (B) socio-environmental conflicts in extractive frontiers and multidimensional violence; and how these generate (C) social movements, resistance and the defense of the commons. Methodologically, my contributions deploy two complementary approaches: (D) development of citizen science tools and multi-case comparative methodologies through the Environmental Justice Atlas (EJAtlas); and (E) creative, feminist and reflexive methodologies, integrating Northern and Southern and feminist epistemologies, socially engaged art-based methods, and experiential pedagogy, to expand how sociological knowledge is generated, shared and transformed.

Empirically, my contribution is a multi-scalar analysis of socio-environmental transformations and their intersections with inequalities, violence and collective resistance. It has been built in three stages: (1) long-term ethnographic fieldwork with Maya-Q'eqchi' communities in Guatemala's Polochic Valley during my Master's and PhD; (2) postdoctoral research that expanded this work to Central America and Indonesia, combining EJAtlas mapping with comparative fieldwork across 15 conflict sites; and (3) my current agenda on the role of aviation in socio-environmental transformations, with a focus on conflicts around airport infrastructures and airport-led touristification.

Resumen del Currículum Vitae:

My work contributes to several fields of knowledge, including: social conflict and violence, by co-developing the Environmental Justice Atlas (EJAtlas) and advancing theoretical frameworks on the multidimensionality of violence; social movement studies, by analyzing environmental and agrarian justice movements, power dynamics and commons/commoning practices as socio-ecological forms of resistance; critical agrarian studies, by examining how oil palm expansion reconfigures livelihoods and power relations; feminist and gender studies, by foregrounding intersectional experiences of dispossession, labor, care and violence shaped by gender, class and ethnicity and by employing reflexive methodologies; public policy and development studies, by developing frameworks to evaluate rural development and poverty reduction policies; and methodology, by combining in-depth case studies with comparative multi-case analyses and socially engaged art as an analytical tool grounded in feminist and participatory action research. My research analyses how and why multi-scalar socio-environmental conflicts emerge and evolve, how resistance against intensive industries (e.g. oil palm, aviation), and which socio-ecological outcomes and "lessons learned" they generate. This trajectory has resulted in 22 publications in the social sciences (11 in Q1/Q2 journals), 1 edited book and 4 book chapters. I have delivered 20 papers at international scientific conferences. I have participated in 11 research projects, as scientific coordinator of 2 competitive R&D projects, Principal Investigator of 4 R&D projects and WP coordinator in 5 projects. I obtained funding to develop 4 action-research projects. I have been awarded 3 competitive research fellowships (e.g. Juan de la Cierva-Incorporación) and have undertaken 7 years and 11 months of pre- and post-doctoral research stays at 9 different institutions. As part of my research leadership, I actively build and sustain research communities, especially among young scholars. I co-founded 3 innovative research groups formed by early-career researchers, including the women researchers' collective FRACTAL. I am and have been an active member of 4 international research groups. I also participate in several international academic networks. These collaborations have resulted in co-authored publications, innovative research and the organization of thematic panels. My research has informed environmental policy debates (e.g. providing analysis for development policies in Guatemala). I engage extensively in public communication of research through e.g., video documentaries, national TV programmes. I also co-founded the educational association Mar de Tierras. I am a committed teacher, having designed and taught courses in 12 undergraduate, Master's and doctoral programmes reaching around 780 students. My cumulative experience amounts to 224 teaching hours. I hold the AQU Lector teaching accreditation (2021). I have supervised 2 Bachelor's theses, 9 Master's theses and 2 PhD theses (one ongoing), and have served on 2 PhD committees and 8 Master's panels, contributing to the development and evaluation of early-career researchers. The quality and originality of my work have been recognized with awards such as the LASA/Oxfam America Martin Diskin Dissertation Award and the ICTA-SS award for the use of arts in research and education.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: GONZALEZ SANTOS, FELIPE
Referencia: RYC2025-054278-I
Correo Electrónico: felipe.gonzalezsantos@gmail.com
Título: Felipe González Santos

Resumen de la Memoria:

My research analyses the behavioural foundations of political participation and democratic resilience, focusing on why some individuals engage, why others remain inactive, and how organisations and institutions shape these choices. I combine large-scale surveys, survey experiments, interviews, and ethnography to examine participation across electoral and non-electoral arenas.

A first line of work develops original theory on care, solidarity and empowerment within social movements. Based on a two-year ethnography of the Spanish anti-eviction movement, I formulated the concept of care-based mobilisation and a mechanistic account of empowerment among vulnerable groups. This work, recognised with awards from the European Sociological Association and CEU, highlights how moral and relational dynamics structure mobilisation processes.

A second line of work investigates protest participation and political engagement using cross-national survey data. I have analysed distinct protest styles, the role of structural and biographical constraints, and the transition from potential to actual participation. These contributions challenge classical threshold models and clarify why willingness to participate often fails to translate into action.

A third and increasingly central line of research examines democratic backsliding, political attitudes and electoral behaviour. My recent publications in *Democratization* and *Perspectives on Politics* show how democratic erosion reshapes voter decision-making, opposition strategies and mobilisation opportunities. This emerging agenda connects political sociology with the comparative study of democratic decline.

The research line proposed for the Ramón y Cajal fellowship builds directly on this agenda and represents a major conceptual and methodological advancement. The project will develop the first multidimensional and comparative measure of democratic attitudes, using nationally representative surveys across several European countries. The project's design will uncover the mechanisms that lead some citizens to defend democratic norms while others tolerate or support backsliding.

This project consolidates my emerging contributions on democratic attitudes and backsliding while significantly expanding them into a comprehensive, theoretically grounded and methodologically innovative research programme. It positions me to generate high-impact knowledge on the behavioural foundations of democratic erosion and democratic defence, addressing a central question in contemporary Political Science.

Resumen del Currículum Vitae:

My research lies at the intersection of political sociology and political science, examining why citizens participate in politics, why they abstain, and how democratic institutions and civil society shape these behaviours. I study mobilisation and political behaviour using mixed methods—nationally representative surveys, survey experiments, ethnography, protest event analysis and advanced quantitative modelling. My work contributes to core Political Science debates on participation, democratic resilience, movement parties and democratic backsliding.

I have published 14 journal articles (12 in JCR Q1), a monograph in a SPI publisher and 3 book chapters. My publications appear in leading Political Science outlets including *Perspectives on Politics*, *Journal of European Public Policy*, *Political Studies*, *Democratization* and *International Affairs*. Three Q1 articles and my monograph are solo-authored, demonstrating clear scientific independence. My work has accumulated more than 330 citations and a h-index of 10, according to Google Scholar.

A defining feature of my trajectory is its strong international dimension. I have studied or worked in Austria, Hungary, the United Kingdom, Romania, Belgium, Italy, France and the United States. I completed research stays in California, New York and Hungary. For the last 5 years I have held postdoctoral appointments in the United Kingdom and Romania. I have participated in major international consortia funded by Horizon Europe, NextGenerationEU, the Volkswagen Foundation, the Open Research Area scheme and the European Climate Foundation. These experiences equipped me to coordinate cross-national surveys, experiments and qualitative fieldwork, and to work within multidisciplinary and multi-country teams.

I have substantial leadership experience: I have been PI of a project funded by the European Climate Foundation, Work Package Leader of a NextGenerationEU funded project, and member of the coordination team of a HORIZON funded project. I have managed research budgets, survey tenders and fieldwork teams, supervised PhD researchers, and led policy-oriented dissemination, including high-level events in Brussels with senior EU institutional actors.

I am committed to scientific service and public engagement. I serve on the Board of the Social Movements Research Network of the Council for European Studies, often act as discussant and chair in major international conferences, review for leading journals, and regularly comment for major media outlets such as BBC World News, The Guardian, El País, Cadena SER, and elDiario.es.

I am also committed to open science: Over 90% of my publications are gold open access, all the survey experiments I have designed are publicly are preregistered, and all analytical code is publicly available.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: FREDDI, ANDREA
Referencia: RYC2025-056466-I
Correo Electrónico: andrea.tnom@gmail.com
Título: Andrea Freddi's research career: frontiers, environment, and power in Latin America

Resumen de la Memoria:

Andrea Freddi is an anthropologist with an international trajectory shaped by research on environment, migration, extractivism, and borders in Latin America, particularly Guatemala and the Chilean-Argentinian Patagonia. He has led FONDECYT projects and participated in international academic networks, consolidating a line of work that combines multi-sited ethnography, anthropology of infrastructure, and socio-environmental studies. His contributions include articles in leading journals such as *Journal of Contemporary Ethnography* (2025), where he introduces the concept of "environment-as-infrastructure" to analyze tensions between conservation and extractivism in Patagonia; *Ethnos* (2024), which examines Catholic evangelization and power in Guatemala, highlighting continuities within modernization processes; and *Revista de Antropología Social* (2024), which explores the historical and contemporary valuation of the alerce tree in Cochamó through multispecies ethnography. He also published in *Confluente* (2024) an analysis of Central America beyond post-conflict, and contributed to collective volumes such as *Houses Transformed* (2024), with a chapter on the social creativity of remittance houses in Guatemala.

His book *Il viaggio e la trama* (2020), based on his doctoral dissertation, investigates migration and development in Guatemalan Indigenous communities, showing how returning migrants become new community authorities. The book was translated into Spanish and published in Chile in 2025. Freddi has also promoted multimodal anthropology outputs, including the graphic novel *Donde se juntan las aguas* (2025), which reconstructs the cultural history of Northern Patagonia through ethnographic narratives, and the photographic exhibition *La hebra del alerce* (2024), disseminated in Chile and Argentina with strong community impact.

He has coordinated panels and international seminars, such as at EASA 2024 in Barcelona, and has been invited to conferences in Peru, Germany, Italy, and the United States. His collaborations with universities in Argentina, Mexico, Spain, and Italy have strengthened academic networks and produced joint publications. His academic mobility includes visiting positions at Universidad Autónoma de Madrid (2024), University of Milano-Bicocca (2022), University of California, Berkeley (2013), and Universidad de Río Negro (Argentina), where he organized binational meetings on the Northern Patagonian frontier.

In terms of ethics and open science, Freddi emphasizes the importance of free and accessible knowledge, publishing mainly in open access journals and disseminating materials through academic platforms and social media. His projects have been approved by ethics committees, ensuring informed consent, confidentiality, and respect for Indigenous communities.

In sum, Andrea Freddi's career combines high-impact research in socio-environmental and migration anthropology, international academic production, methodological innovation through multimodal anthropology, and a strong commitment to ethics, internationalization, and the social transfer of knowledge.

Resumen del Currículum Vitae:

I completed my PhD at the University of Turin on a scholarship, having been selected as one of the eight best candidates. As part of the programme, I conducted multi-sited ethnographic research in Guatemala and the United States, examining the impact of transnational migration and post-genocide development policies on the political system of a Mayan Mam indigenous community. I published the results in eight WoS and Scopus-indexed scientific journal articles and book chapters. These contributions analyse the emergence of new political subjectivities in the context of migratory processes. This research also resulted in the publication of a peer-reviewed monograph which has been adopted by Italian university programmes (Freddi, 2020), as well as numerous presentations at international conferences. These achievements have emerged from various international collaborations, including conferences, guest lectures, and research stays in the United States, Germany, Mexico, Guatemala, and Chile.

I continued my research career in Chile, joining the Department of Anthropology at the University Alberto Hurtado and then the Department of Social Sciences at the University of Los Lagos, where I currently work as Associate Professor. I was awarded two significant national research grants as Principal Investigator through competitive bidding run by the National Research and Development Agency (ANID). These were the PAI77190103 grant for academic installation and the Fondecyt Initiation 11220920 – the most significant national research grant. These projects have shaped my current research, which focuses on analysing the paradoxes of green capitalism in the (post)frontier region of northern Patagonia, an area that has received limited attention from anthropologists. Through multisited ethnography in Argentina and Chile, I analysed the social impact of tourism, extractivism, and environmental conservation on peasant and indigenous communities. This has enabled me to make an original contribution to the field of environmental anthropology, highlighting new forms of economic, aesthetic and moral valuation of nature in the context of the climate crisis. To date, I have led a multidisciplinary research team comprising two anthropologists, a historian, a photographer, and an illustrator, and integrated techniques such as participatory cartography, photo-elicitation, and the use of audiovisual tools. The findings have been published in five scientific articles in WoS and Scopus-indexed journals and disseminated in papers at international conferences and guest lectures. These contributions have been made through international collaborations with Argentina, Italy and Spain. My research aims to promote an ongoing dialogue between academia and communities by organising various artistic and educational activities, like a travelling photographic exhibition on alerce wood architecture, and an (ethno)graphic novel where scientific findings were represented through comic book language,

At the University of Los Lagos in Chile, I created and coordinated the Ethnography Laboratory.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: GIUSTO, SALVATORE
Referencia: RYC2025-055383-I
Correo Electrónico: s.giusto@alumni.utoronto.ca
Título: Organized Crime, Populist Politics, and Digital Culture in Southern Europe: A Multisite Ethnography.
Resumen de la Memoria:

My research activities reflect a sustained ethnographic interest in how organized-crime-sponsored and state-regulated modes of cultural production operate under current neoliberal conditions of governance, and the complementary role they play in Southern European populist dynamics of structural violence and political radicalization. My PhD research project, "Vox Populist" (2013-2019), analyzed the populist dynamics of subaltern publicity formation emerging from the organized-crime-sponsored local analog media industries of Naples, Italy, along with their outcomes in terms of structural violence. It did so through extended ethnographic fieldwork I conducted among Neapolitan organized-crime-sponsored contexts of analog media production, circulation, and marketing. The project showed how the neoliberal management of such media industries by the Camorra (a local criminal organization), operating in tandem with equally neoliberal state-regulated modes of cultural production, disciplined the conditions of informal employment and social visibility emerging from the Neapolitan cultural industries across exploitative clientelist networks, which intersected local politics via populist governmentality. My subsequent Marie Skłodowska-Curie postdoctoral project, "SCAR-FACEBOOK" (2022-2024), examined Camorra-sponsored digital cultural productions and social media networking processes as a further venue for understanding how organized crime intersects the simultaneously neoliberal and populist configurations of the current Italian public sphere. Combining in-situ ethnography I conducted in Naples with digital ethnography, I traced the online forms of relational labour connecting Neapolitan Camorra-sponsored online "influencers," digitally active far-right populist leaders, and their respective social media "followers." The project showed how these online practices further reproduced conditions of structural violence within the Southern Italian social peripheries, reinforcing marginalizing hierarchies of value and fostering hybrid neoliberal-populist forms of online governmentality. Building on this research trajectory, my next line of research will ethnographically assess the transnational interplay between organized-crime-sponsored digital dynamics of cultural productions and far-right online populism in Southern Europe in a comparative perspective, focusing on the social peripheries of Italian and Spanish urban areas recently characterized by growing organized crime presence and increasing consent for far-right populist political movements, such as those of Naples, Milan, Barcelona, and Valencia, together with their cyberspaces. Through multi-sited, multi-modal research techniques that will blend in situ and digital ethnography within the four selected locations, I will examine how these dynamics engender populist forms of subaltern political subjectivity and how they influence each other transnationally, offering new comparative insights into the socio-cultural and political implications of digital mediation in contemporary Southern Europe. At the same time, the proposed line of research will provide qualitative datasets informing the elaboration of new public policies, information campaigns, and offline and online community interventions designed to challenge the conditions of structural violence elicited by the controversial dynamics under analysis.

Resumen del Currículum Vitae:

I am a social anthropologist with a career background in researching and teaching in multiple Universities throughout Europe and North America. I obtained my PhD in Social Anthropology at the University of Toronto in 2019. My work explores the intersections of anthropology, cultural production, digital media, organized crime, mafia cultures, neoliberalism, and populism, with an ethnographic focus on Southern Europe. My PhD studies (2011-2019) and my doctoral research project (2013-2019) have been funded by the Wenner-Gren Dissertation Fieldwork Grant (USA), the University of Toronto's PhD Pilot Research Award (Canada), and the Université de Montréal's Pandolfi Bourse (Canada). The postdoctoral research project I have subsequently conducted at the University of Amsterdam (the Netherlands, 10/2022-01/2025) has been supported by the Marie Skłodowska-Curie Fellowship (10/2022-09/2024) and the University of Amsterdam's Fellowship in Global Digital Cultures (10/2024-01/2025). Since February 2025, I have been a Visiting Researcher at Universitat Pompeu Fabra (Spain) and, since November 2025, a Substitute Professor in the Department of Social Anthropology at the Universitat de Barcelona (Spain), where I also supervise MA theses. At Universitat Pompeu Fabra, I am affiliated with the Research Group on Youth, Society, and Communication (JOVIS). During my career, I have been active in international academic networks, including the American Anthropological Association and the European Associations of Social Anthropologists, and have served as a reviewer for Wiley, Sage, Springer, and Berghahn Books. I have held teaching appointments as an Adjunct Professor at the University of Toronto (2018-2019; 2022), Lecturer at the University of Amsterdam (2023-2024, under the Marie Skłodowska-Curie Fellowship scheme), and Assistant Professor at Bishop's University (Canada, 2020-2022). I authored 10 publications and co-authored 2 publications, 9 of which for scientific journals (3 JCR Q1, 1 Q2, 1 Q3, 4 Q4 or equivalent), with 39 citations on Google Scholar (including 4 h-index and 1 i10-index). A book based on my PhD research will be published by Berghahn Books (USA) in 2026. I am also managing an additional edited volume for Il Sileno Edizioni (Italy), inspired by an international seminar I organized at the University of Amsterdam and also scheduled for publication in 2026. Four of my publications are open access through institutional support. I consistently disseminate my research beyond academia. My work has been presented to public agencies and NGOs, including Italian anti-mafia organizations and the Dutch public security agency RIEC Amsterdam-Astelland. My research also reached international audiences through my work of ethnographic video-making, including the documentary "Good Times for a Change" (2014), which I produced, co-wrote, and co-directed, and for which I conducted independent fieldwork research in Ontario (Canada). The film received international awards, expanding the public impact of my work. Leadership and organizational skills are a core dimension of my profile. I have designed and coordinated academic seminars, chaired panels at international conferences, delivered keynote talks, managed crowdfunding campaigns for ethnographic film production, and secured competitive international research funding, including a Marie Skłodowska-Curie Fellowship.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias sociales
Nombre: RUSZEV, SZILVIA
Referencia: RYC2025-054458-I
Correo Electrónico: ruszev@gmail.com
Título: Generative AI in creative media

Resumen de la Memoria:

My research trajectory emerges from more than two decades of professional audiovisual practice and interdisciplinary academic work across Europe, the United States and the United Kingdom. Trained as a film editor and later obtaining a PhD in Media Arts and Practice, I have consistently examined how technological transformations reshape the epistemic, creative and ethical dimensions of audiovisual media. Over time, this trajectory has converged into a distinctive research line at the intersection of audiovisual communication, media studies, digital studies, and artistic research, with a particular focus on responsible AI in media.

As Principal Investigator of the AHRC/BRAID-funded project Shared-Posthuman Imagination (2024), I directed an interdisciplinary team examining the cultural, creative and labour implications of generative AI in filmmaking. Through workshops with more than 200 participants, multi-stakeholder dialogue, and practice-based experiments, the project produced one of the first sector-facing frameworks for responsible AI in media, including a definition, ethical guidelines, risk matrices and policy recommendations. The resulting open-access report and forthcoming Routledge chapter have contributed to shaping UK debates on authorship, copyright, skills, and creative labour in AI-enabled production.

This line of work continued as PI of the Innovate UK / BridgeAI AIMICI project (2025), where I co-developed the first responsible AI e-learning programme for screen media professionals in collaboration with industry partners. My methodological approach combines human-centred design, system thinking and practice-led inquiry to analyse how AI mediates creativity and representation while developing new collaborative workflows that foreground ambiguity, plurality and contextual sensitivity.

Internationalisation is a defining feature of my trajectory. I have collaborated with institutions and networks across Europe, North America and Asia, contributed to international conferences, and built cross-sector partnerships connecting academia, industry and policymaking. Through this sustained engagement, I contribute to global debates on AI, creativity and emerging media, shaping both scholarly discourse and professional practice.

My future objectives involve establishing a research lab at the host institution under the title Situated Audiovisual Intelligence Lab (SAIL) to develop interpretive, context-aware, and socially embedded AI systems for audiovisual culture. The aim is to expand the current framework to address AI skills gaps in the industry and foster global discourse on AI, creativity, and emerging media technologies, positioning Spain at the forefront of international efforts in responsible AI. Methodologically, the research will integrate practice-based research, participatory design, ethnography, computational analysis, and theoretical inquiry to generate new conceptual frameworks, technological prototypes, artistic projects, and publicly accessible outputs. Through this integrated trajectory spanning research leadership, international collaboration, artistic experimentation and sector impact, I aim to consolidate a pioneering research line on responsible, interpretive and situated AI for screen media, grounded in both theoretical innovation and practical transformation of creative industries.

Resumen del Currículum Vitae:

I am an academic with an international and interdisciplinary trajectory spanning Hungary, Germany, the US and the UK. I hold a Diploma in Film Editing, a PhD in Media Arts and Practice, and a Postgraduate Certificate in Education Practice. My CV evidences strong leadership, success in securing competitive research funding with strong societal impact, and substantial mentoring capacity. The strength of my research lies in its interdisciplinarity and integration of audiovisual creative practice with media theory and technological innovation. My work examines the epistemic, creative and ethical implications of emerging technologies in screen-based practices and builds on more than two decades of experience as a professional film editor and media artist.

Across more than twenty years of experience, I have developed a coherent research profile focused on audiovisual communication, emerging media technologies and responsible AI. My publications appear in international peer-reviewed journals such as Screenworks, Cinergie, Apparatus and Images Secondes, complemented by artistic research exhibited at SIGGRAPH, Codame, Femmebit and the Geneva International Film Festival. My contributions include new frameworks for cinematic rhythm visualisation, analyses of digital embodiment, investigations into VR narrative, and theoretical work on post-cinema and digital capitalism.

As an educator, I have taught at renowned institutions including Film University Babelsberg, CalArts, ArtCenter, Occidental College, Bournemouth University and UCL supporting international cohorts in the development of research skills, methodological literacy and professional practice. I have supervised numerous creative and written projects, including BA/MA dissertations at Babelsberg and IFS, and four current PhD projects at UCL and Bournemouth University. Former students now hold academic posts or work as award-winning editors.

I have secured major competitive research funding as Principal Investigator, notably the AHRC/BRAID project Shared-Posthuman Imagination (2024) and the Innovate UK/BridgeAI AIMICI project (2025). These projects established a new research line on responsible AI for media creation, produced influential sector reports, and contributed directly to policy and industry practice. Alongside these, I have served as co-investigator on projects addressing film practice, audiovisual pedagogy and decolonising media imaginaries. My leadership extends to curriculum development, direction of research teams, supervision of postgraduate researchers, and contributions to national and international research networks.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My contributions to society demonstrate a sustained commitment to cultural, industrial and technological impact. AIMICI directly supports UK industry by addressing AI skills gaps and promoting responsible adoption. The Snowflake collaboration tool developed at Google/USC contributed to innovations in transmedia workflows. I have shared research insights at the House of Lords, Jisc AI, the Institute for Data Science and AI, Edimotion Academy and Jihlava Documentary IFF. Jury, editorial and curatorial roles—including forthcoming work for the CILECT Editing Book, the journal Hipertext, peer reviewing for major academic presses (Routledge, Springer, Edinburgh), festival jury duties and conference organisation—further strengthen cultural and academic ecosystems



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: ZYUZIN , MIKHAIL
Referencia: RYC2025-054649-I
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Título: Functional Nanomaterials for Biomedical Applications

Resumen de la Memoria:

Dr. Mikhail V. Zyuzin is a researcher in the field of Development of Functional Nanomaterials, Nanomedicine, and Biophotonics. His contributions are organized into three key areas:

1. **Synthesis of Functional Nanomaterials:** Dr. Zyuzin developed conventional "batch" and microfluidic synthesis approaches to produce nanostructured materials with predictable sizes and shapes.
 2. **Therapy and Delivery:** He innovated functional, composite nanomaterials for controlled intracellular drug release and combined tumor therapies (e.g., photothermal therapy combined with chemotherapy).
 3. **Nanothermometry:** Addressing safety in hyperthermia treatments, he studied advanced techniques for intracellular temperature sensing. This includes Raman-based sensing, ODMR sensing with nanodiamonds, and Fluorescence Lifetime.
- His innovation is evidenced by the granting of a national patent for radiolabeled calcium carbonate particles, bridging fundamental science with nuclear medicine needs. His research excellence has been recognized via the President's Scholarship of the Russian Federation and the St. Petersburg Government Award for Young Scientists.

Dr. Zyuzin's career is characterized by extensive transnational mobility and rapid progression to independence. Following his Diploma in Moscow, he obtained his PhD at Philipps-University Marburg (Germany), transitioning from theoretical physics to experimental biophotonics. His profile was further diversified through research missions at world-leading institutions, including the University of Melbourne (Australia), the Italian Institute of Technology (Italy), and the Institute for Advanced Studies in Madrid (Spain). Currently, he serves as a Visiting Professor at Harbin Engineering University (China). Upon returning to the Russian Federation (ITMO University), Dr. Zyuzin successfully transitioned from researcher to Group Leader. He demonstrated robust leadership by establishing Cell and Microfluidic Laboratories from scratch and securing substantial competitive funding (approx. \$2M USD) as Principal Investigator for projects regarding nanophotonic devices and targeted therapy. He has successfully supervised 5 PhD students and over 15 undergraduates, with graduates securing positions at top-tier institutions globally (e.g., University of Toronto). He actively serves on PhD defense councils and acts as a referee for the Russian Science Foundation and high-impact journals.

The proposed research line focuses on the Precision Engineering of Functional Nanomaterials via Microfluidic Synthesis Platforms. This project represents a strategic shift from material discovery to production technology, aiming to replace traditional "batch" chemistry with automated, high-throughput microfluidic protocols.

The primary motivation is to resolve the bottleneck of reproducibility and scalability in nanomedicine. Specific objectives include:

- **Design:** Fabrication and simulation of hydrodynamically optimized microfluidic chips.
- **Synthesis:** Establishing robust protocols to correlate process parameters with material properties.
- **Validation:** Biological approbation of these materials for advanced theranostics.

This research leverages Dr. Zyuzin's dual expertise in microfluidic engineering and preclinical biomedicine to standardize the production of therapeutic agents, bridging the gap between academic innovation and medical application.

Resumen del Currículum Vitae:

Dr. Mikhail V. Zyuzin is currently an Associate Professor at the Faculty of Physics, ITMO University (St. Petersburg, Russia) and a Visiting Professor at Harbin Engineering University (China). He holds a PhD in Natural Sciences from Philipps-University Marburg (Germany, 2017). Dr. Zyuzin has established a strong international reputation in the fields of Material Science, Biophotonics, and Nanomedicine.

📄 **Scientific Output:** Co-author of over 90 peer-reviewed publications in high-impact journals including ACS Nano, Laser & Photonics Reviews, Small, Chemical Engineering Journal, and Biomaterials.

📄 **Metrics** (as of Nov 2025): h-index of 32; over 3,000 citations (Google Scholar).

📄 **Innovation:** Holder of 1 National Patent (2022) regarding radiolabeled carriers for nuclear medicine.

Dr. Zyuzin's research career is defined by extensive international mobility and interdisciplinary expertise. During his doctoral studies in Germany and research visits to the University of Melbourne (Australia), the Italian Institute of Technology (Italy), and the Institute for Advanced Studies in Madrid (Spain), he collaborated with leading scientists (e.g., Profs. Parak, Caruso, Pellegrino). His current research focuses on three synergistic areas:

1. **Development of Functional Nanomaterials:** He spearheaded the implementation of microfluidic platforms at ITMO University. This work focuses on moving beyond "batch" chemistry to automated, high-throughput synthesis to ensure the reproducibility and scalability of functional nanomaterials [J. Mater. Chem. A, 2024, 12, 29776].

2. **Theranostic Nanomaterials:** Development of light-sensitive, stimuli-responsive carriers for controlled drug delivery and release. He has pioneered approaches for combined tumor therapies, validated in preclinical settings [Light: Advanced Manufacturing, 2025, 6, 5, 1-19].

3. **Nanothermometry:** Design of resonant dielectric and fluorescent nanoparticles (including nanodiamonds) for precise intracellular temperature sensing. This work addresses critical safety challenges in photothermal therapy [Laser Photonics Rev., 2025, e00691].

Upon joining ITMO University, Dr. Zyuzin demonstrated independence by establishing a new research direction and forming a robust group comprising Postdocs, PhDs, and undergraduates.

📄 **Mentoring:** He has successfully supervised 5 PhD theses (Drs. Koryakina, Talianov, Fatkhutdinova, Gerasimova, and Peltek). His commitment to human resources is evidenced by the career trajectories of his graduates, who now hold positions at prestigious institutions such as the University of Toronto (Canada) and Harbin Engineering University (China). He has further mentored over 15 Bachelor's and Master's students.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Research Management: Dr. Zyuzin has a proven track record of attracting and managing competitive funding. He served as the Principal Investigator for a large-scale Russian Science Foundation (RSF). Additionally, he supervises multiple ongoing grants focused on targeted cancer therapy funded by the RSF and the Ministry of Science and Higher Education. Dr. Zyuzin actively serves the scientific community as a peer reviewer for top-tier journals and as an organizer of international schools (Bio-METANANO, Biophotonics School). He frequently gives invited talks at international conferences.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: MESQUITA COELHO, JOÃO CARLOS
Referencia: RYC2025-054517-I
Correo Electrónico: jmesquita@us.es
Título: Low-dimensional nanomaterials for sustainable printed electronics (SusPrint).

Resumen de la Memoria:

Throughout my research career, I have specialised in advanced energy storage devices that exploit the optimal properties of nanomaterials to overcome the limitations of conventional bulk counterparts. This summary outlines my scientific trajectory and highlights some of my most relevant publications and projects.

From 2012 to 2016, I completed a PhD in the School of Chemistry at Trinity College Dublin (TCD) under the supervision of Professor Valeria Nicolosi (ORCID: 0000-0002-7637-4813). My research focused on developing two-dimensional (2D) nanomaterials by exfoliating layered bulk crystals in a liquid phase, achieving high surface area and abundant active sites that enhance double-layer formation and optimise electrode storage capacity. In this context, I made key contributions to practical supercapacitors, by synthesising a 2D graphene/manganese oxide nanosheet hybrid via a novel single-step liquid-phase co-exfoliation method, which more effectively harnessed the pseudocapacitive properties of manganese oxide (2D Mater: 10.1088/2053-1583/2/2/025005). I also prepared lithium titanate nanoparticle/single-wall carbon nanotube composite electrodes using a combination of ultrasound irradiation and ultrasonic spray deposition (Sci Rep:10.1038/s41598-017-06908-3).

From 2017 to 2020, I was a postdoctoral researcher at TCD, where I further developed work on printed flexible supercapacitors and lithium and beyond-lithium batteries. During this period, I participated in a Nokia/Bell Labs project aimed at improving battery manufacturing processes, contributing to the demonstration that segregated carbon nanotube networks can considerably increase battery areal capacity. This enabled the fabrication of composite electrodes up to 800 µm thick, combining carbon nanotubes with various lithium storage materials to achieve high electrical conductivity, low charge-transfer resistance and near-theoretical specific capacities, even for thick electrodes (Nat Energy:10.1038/s41560-019-0398-y).

From 2020 to 2023, I was a researcher at the Materials Research Centre (CENIMAT) at NOVA University Lisbon, as well as Principal Investigator of a competitive project funded by the Portuguese Foundation for Science and Technology (FCT). I secured this position through a prestigious Individual Call to Scientific Employment Stimulus grant focused on developing sustainable exfoliation methods for nanomaterials for use in printed supercapacitors. In this work, I demonstrated that toxic solvents typically employed in liquid-phase exfoliation can be replaced by the green solvent Cyrene without compromising supercapacitor performance (JPhys Energy: 10.1088/2515-7655/adca57), and this research led to the supervision of two PhD theses. Furthermore, I pioneered the use of laser-induced graphene (LIG) on paper for supercapacitor applications (Microchim Acta:10.1007/s00604-022-05610-0), resulting in several additional publications on LIG on sustainable substrates.

Since 2023, I have been a postdoctoral researcher in the Department of Condensed Matter Physics at the University of Seville, working under the EMERGIA programme. I currently coordinate a project focused on the sustainable production of nanomaterials for printed energy storage devices, with particular emphasis on device integration and scalable routes that bridge laboratory research with real-world applications.

Resumen del Currículum Vitae:

Throughout my scientific career, I have published a total of 49 high-quality original research papers, acting as the first author or an equal contributor in 15 of them, the corresponding author in nine, and the last author in three (SCOPUS). I have also written or contributed to five revision articles and four book chapters. Of these papers, 61% were published in Q1 journals and 54% were open access. As of December 2025, my work has received a total of 5,741 citations, giving me an h-index of 30 and a FWCI of 2.77 (SCOPUS). Since I began my PhD I gave 14 oral presentations at well renowned conferences, being invited speaker at 4 of them: XXI Brazilian Materials Research Society Meeting, Maceió, Brazil (2023); Materials Research Society Spring 2024 (Virtual) conference; the 2024 IEEE International Flexible Electronics Technology Conference (IFETC) in Bologna, Italy; and the Materials for Sustainable Development Conference (MATSUS25) in Seville, Spain (2025).

My career has also been shaped by a high degree of international mobility. As an undergraduate, I obtained my BSc and MSc at the University of Porto in Portugal. I then attended Trinity College Dublin (TCD) in Ireland as a PhD student (2012–2016). Following my first postdoctoral fellowship at TCD (2017–2020), I received a research grant in Lisbon, Portugal (2020–2023), and I have held my current position in Seville, Spain since 2023. In 2022, I spent two weeks at VTT in Finland, where I characterised laser-induced graphene coin cells. In 2024, I undertook a short research and teaching placement at UNESP in São Paulo, Brazil, focusing on electrochemical characterisation and bio-based materials for printed devices.

In total I have obtained 4 projects as PI from highly competitive calls. An Individual Call to Scientific Employment Stimulus grant (CEECIND/00880/20182; €153 700,56) and a research project (2022.01493.PTDC - €49 924,43) from The Foundation for Science and Technology (FCT), Portugal. A regional talent attraction grant from Junta de Andalucía, Spain (EMC21_00174 - €157k salary + €100k research funds). Finally, a project from Agencia Estatal de Investigación, Spain (PID2024-159849NB-I00. My achievements in LIG led to the Santander/NOVA 2021 Collaborative Research Award project on graphene-based platforms for biomedical applications (€15k). While at NOVA I helped writing the EU funded SUPERIOT (101096021) project, which had a strong focus on sustainability and responsible electronics.

I directed a PhD student (finished in 2024) and I am co-directing other (to be finished in 2026). frequently participate in communication and outreach activities and in the organization of international meetings. Since 2022, I have been an organizer of the printed electronics symposium at the annual Brazilian Materials Research Society Conference (BMRS) in Brazil. I have peer-reviewed 38 papers in relevant journals in the field (Web of Science). I



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

was also a guest editor in npj 2d materials and applications for a collection entitled “2D Nanomaterials for Energy Applications” and in a special issue on Sustainable Development of Printed Electronics: From Materials Processing to Devices Implementation from ACS Applied Electronic Materials. I also frequently participate in outreach activities, and I am currently a member of the ICMS Commission for Dissemination and Communication.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: ARAMBERRI DEL VIGO, HUGO
Referencia: RYC2025-055035-I
Correo Electrónico: hugoaramberri@hotmail.com
Título: Theory and modelling of topological ferroelectric orders and their responses
Resumen de la Memoria:

My research investigates the interplay between nanoscale structural dynamics and functional properties in ferroic and topological materials. I have developed expertise in first- and second-principles modeling, recently complemented by machine-learned force fields, enabling the study of complex ferroic phase transitions, topological textures, and tunable functional responses. My work integrates fundamental theoretical questions on structural instabilities, ferroic and topological orders, and collective excitations with close experimental collaborations, allowing theory to guide experiments and vice versa.

Over the years, I have progressively established scientific independence and leadership. I currently lead a research line on ferroelectric domain dynamics, mentor early-career researchers, supervise international PhD secondments and master students, and have secured competitive funding as Principal Investigator. My work has resulted in the discovery of novel ferroelectric textures, development of predictive computational frameworks, and guidance of experimental studies on functional responses. These contributions are recognized internationally through publications, invited talks, and peer-review activities.

Internationalization and Collaboration

International mobility has been a central aspect of my career, including secondments in Hungary and Switzerland, postdoctoral positions in the USA and Luxembourg, and collaborations with groups across Europe, the USA, and Asia. More than half of my recent publications involve international partners, and I actively participate in European networks on topological and functional materials. These experiences have allowed me to establish a broad, interdisciplinary network, fostering collaborations that bridge theory and experiment.

Future Research Programme

Building on my trajectory, I will focus on novel moiré systems in oxide membranes, providing new platforms for theoretical characterization and prediction of emergent structural and functional topological dipole textures. By combining first-principles modeling with machine-learned force fields, I aim to establish a microscopic foundation for these systems, delivering predictive insight for experiments and enabling control over emergent functional responses in low-dimensional oxide materials.

Resumen del Currículum Vitae:

I am currently a Lead Research and Technology Scientist at the Luxembourg Institute of Science and Technology (LIST), where I lead a research line on topological and nanoscale ferroic textures. My work combines first-principles simulations, effective modelling, and methodological development to guide discoveries and experiments on functional oxides. Recent projects have opened pathways to predict new topological and chiral states, engineer emergent excitations, and design novel antiferroelectric and ferroelectric materials and responses. I was awarded the competitive FNR CORE grant BUBBLACED (664 k€, sole PI), supporting my group's research on the dynamics of ferroic domains.

Career Trajectory

I have nearly nine years of continuous postdoctoral research experience across Spain, the United States, and Luxembourg. I obtained my PhD in condensed matter theory at the Institute of Materials Science of Madrid (ICMM-CSIC) and the Autonomous University of Madrid (UAM, 2016), followed by a postdoctoral position at the Institute of Materials Science of Barcelona (ICMAB-CSIC, 2016–2017). I then held international postdoctoral appointments at California State University, Northridge (USA, 2017–2018) and at LIST (Luxembourg, 2018–2022), where I established my current research line and joined the permanent scientific staff (2022–present).

Research Lines

My research focuses on the discovery and optimization of ferroic and topological materials through predictive computational modeling. I combine accurate first-principles simulations with theory and modelling to uncover emergent collective behaviors, including novel quasiparticles in ferroelectrics, routes to antiferroelectricity in complex oxides, and the origin of anomalous electromechanical effects. These insights provide design principles for next-generation non-volatile memories and unconventional computing architectures based on ferroic oxides. Strong collaborations with experimental groups and international visibility have further extended the reach and validation of these findings.

Scientific output and impact

I have authored 40 peer-reviewed publications, including key first- and last-author contributions in Science Advances and Physical Review Letters, alongside co-authorship in leading journals such as Nature, Nature Materials, Advanced Materials, and Nature Communications. My work has accumulated over 990 citations, with 267 citations from first-author publications, demonstrating visibility and scientific autonomy. Citation trends show sustained growth in recent years (~50% annually since 2020), driven by the development of original methodologies and the prediction of novel



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

ferroic and topological phenomena. Several publications have directly inspired experimental studies across Europe and the United States. I have delivered 15 invited talks and numerous contributed presentations at international conferences, further evidencing recognition by the scientific community. My work also includes knowledge transfer projects with industry, applying predictive simulations to practical materials development.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: GARCÍA ASTRAIN, CLARA
Referencia: RYC2025-056549-I
Correo Electrónico: claragarciaastrain@hotmail.com
Título: Functional polymers for sensing applications

Resumen de la Memoria:

En 2011, obtuve una beca predoctoral de la Universidad del País Vasco (UPV/EHU) para el desarrollo de hidrogeles entrecruzados e hidrogeles bionanocompuestos utilizando química clic (Supervisoras: Prof. Gabilondo y Corcuera). Durante este tiempo, recibí una beca de la UPV/EHU para realizar una estancia de 4 meses en el Instituto de Tecnología de Karlsruhe (KIT), Alemania, bajo la supervisión de la Dra. Fruk. En 2015, obtuve mi doctorado (Doctorado Internacional) con la máxima calificación en la UPV/EHU y recibí el premio a la Mejor Tesis Doctoral 2015 otorgado por el Grupo Especializado de Polímeros (GEP) de la RSEQ. Este trabajo fue pionero en el uso de la reacción de Diels-Alder para el entrecruzamiento de hidrogeles basados en biopolímeros con nanopartículas funcionalizadas. Tras finalizar mi doctorado, trabajé como investigadora postdoctoral en el mismo grupo y realicé una estancia de 1 mes en el ICTP-CSIC bajo la supervisión de las Profs. Mijangos y Hernández. A finales de 2016, me incorporé como investigadora postdoctoral al grupo del Profesor Luc Avérous en el Institut de Chimie et Procédés pour l'Énergie, l'Environnement et la Santé (ICPEES), un centro de investigación mixto entre la Universidad de Estrasburgo y el Centro Nacional de Investigación Científica (CNRS) para trabajar en el diseño de materiales innovadores basados en biopolímeros. Posteriormente, trabajé como investigadora postdoctoral en BCMaterials (2017-2018), bajo la supervisión del Prof. Lanceros, donde diseñé materiales inteligentes para aplicaciones en sensores. Entre 2018 y 2024, trabajé en CIC Biomagune, en el grupo del Prof. Liz-Marzán, primero como Juan de la Cierva Formación y, posteriormente, como Juan de la Cierva Incorporación. Aplicando mi experiencia en el diseño de hidrogeles, desarrollé andamios nanocompuestos poliméricos impresos en 3D y modelos celulares tridimensionales para monitorizar el crecimiento tumoral mediante Espectroscopía Raman Amplificada por Superficie (SERS). He co-dirigido una tesis doctoral junto con el Prof. Liz-Marzán, defendida con éxito en 2023. En junio de 2024, me incorporé a POLYMAT como Investigadora Ikerbasque para establecer mi grupo de investigación (FunPolySens) enfocado al desarrollo de polímeros funcionales para el diseño de biosensores que actualmente cuenta con 1 investigadora postdoctoral, 2 estudiantes de doctorado y 2 estudiantes de master/grado. Desde entonces, he conseguido mi propia financiación como investigadora principal con un proyecto de investigación del MICIU (Proyectos de Generación de Conocimiento), del Gobierno Vasco (PIBA 2025) y de la Diputación Foral de Gipuzkoa (Programa RED). Además, en 2025 fui galardonada con la Beca Leonardo de la Fundación BBVA para investigadores y creadores culturales. Mi trabajo ha resultado en la publicación de 47 artículos científicos (4 como autora de correspondencia), 2 capítulos de libro, 4 patentes y he presentado mi trabajo en más de 30 conferencias (4 ponencias invitadas) y colaborado en la organización de varios congresos. Estoy acreditada como Profesora Ayudante Doctor por la ANECA y como Profesora Adjunta por UNIBASQ. Participo regularmente en actividades de divulgación científica como el programa Inspira STEAM o la iniciativa Emakumeak Zientzian y he sido coordinadora de la edición local del festival Pint of Science en Donostia-San Sebastián.

Resumen del Currículum Vitae:

Tras doctorarme en el programa Ingeniería de Materiales Renovables de la Universidad del País Vasco (UPV/EHU) he realizado estancias y trabajado en diversos grupos y centros de investigación como el Karlsruhe Institute of Technology en Alemania; Instituto de Ciencia y Tecnología de Polímeros (ICTP-CSIC) de Madrid; Institut de Chimie et Procédés pour l'Énergie, l'Environnement et la Santé de la Universidad de Estrasburgo (Francia); el Basque Centre for Materials, Applications and Nanostructures (BCMaterials) en Leioa, el centro de investigación CICbiomaGUNE en Donostia-San Sebastián y, actualmente, en POLYMAT en Donostia-San Sebastián. Durante mi trayectoria he trabajado en la síntesis y caracterización de biohidrogeles e hidrogeles bionanocompuestos para aplicaciones biomédicas, en el empleo de reacciones de química clic para la funcionalización y el entrecruzamiento de (bio)polímeros, en la síntesis y funcionalización de nanopartículas, en el desarrollo de materiales poliméricos nanocompuestos para el desarrollo de distintos tipos de sensores (piezoresistivos y termocrómicos), en el desarrollo de hidrogeles plasmónicos para la impresión 3D de modelos celulares y su monitorización (biodetección y bioimagen) mediante Espectroscopía Raman Mejorada en Superficie (SERS) y, más recientemente, en el desarrollo de polímeros con capacidad sensora para monitorizar modelos celulares en 3D, especialmente modelos de infección. Por lo tanto, he desarrollado un perfil multidisciplinar con una amplia experiencia en la síntesis, funcionalización y caracterización (microscopía electrónica, reología, propiedades mecánicas, propiedades físico-químicas) de materiales poliméricos (hidrogeles, films, scaffolds) y nanopartículas metálicas, (bio)impresión 3D, monitorización de modelos celulares y espectroscopía SERS.

Teniendo en cuenta mis intereses y experiencia, mi línea de investigación se enfocará al desarrollo de polímeros funcionales para el desarrollo de sensores. Dada mi amplia experiencia en funcionalización de polímeros, nanomateriales, biofabricación y desarrollo de materiales sensores, pretendo establecer una línea de investigación en torno al diseño de sensores basados en polímeros con propiedades colorimétricas o fluorescentes que puedan adaptarse a la aplicación deseada. Como punto de partida se prevé emplear polímeros conjugados con propiedades ópticas características que puedan ser moduladas en presencia de moléculas diana. Además, se funcionalizarán polímeros con fluoróforos que sean sensibles a estímulos externos y se considerará la incorporación de nanopartículas (plasmónicas, nanotermómetros) con el fin de incorporar simultáneamente en un mismo sistema distintos tipos de sensores. El objetivo principal sería diseñar materiales avanzados basados en polímeros que puedan utilizarse como biosensores para la monitorización de enfermedades o infecciones bacterianas, especialmente en modelos celulares 3D. Estos polímeros sensores también tendrán aplicación en la industria alimentaria para mejorar la trazabilidad y seguridad de los productos o en aplicaciones medioambientales para la detección de contaminantes. Mi objetivo es ampliar mi experiencia en síntesis y funcionalización de polímeros enfocándome en polímeros con propiedades fluorescentes y obtener una comprensión más profunda del desarrollo de este tipo de sensores.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: BLANDEZ BARRADAS, JUAN FRANCISCO
Referencia: RYC2025-056262-I
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Título: SynerMOF: Engineered Metal Organic-Frameworks Driving Synergistic Radiodynamic Activation and Controlled Macromolecule Delivery

Resumen de la Memoria:

Due to its high specificity and selectivity, gene therapy has become a promising strategy for treating diseases, particularly cancer. However, its clinical application is hampered by poor intracellular delivery and stability in biological fluids, often requiring nanocarriers for effective and localised subcellular release.

I have over 15 years of experience in chemistry and nanobiotechnology. My research currently focuses on the development of metal-organic frameworks (MOFs) that become therapeutically active under X-ray irradiation and concurrently deliver siRNA, aiming to harness the therapeutic synergy between the nanocarrier and the cargo.

My experience with nanomaterials began during my PhD in Hermenegildo García's group, working with carbon-based nanomaterials and MOFs for catalysis applications. Afterwards, I joined Ramón Martínez-Máñez's group, shifting my research on nanomaterials toward biological applications. Specifically, I developed mesoporous silica nanoparticles (MSNs) targeting senescent cells, resulting in a strong publication record, the co-supervision of my first PhD student and several undergraduate and MSc students, one patent, and two research awards, among others.

During this time, I realised that most nanocarriers are explored solely as drug delivery systems (DDS), overlooking their potential to activate parallel mechanisms and generate therapeutic synergy with the cargo. Motivated by this and the difficulty of introducing alternative mechanisms into MSNs, I focused my research on MOFs, whose modular assembly incorporates structural features capable of triggering additional therapeutic effects. Thus, I joined Fairen-Jiménez's lab (University of Cambridge), a leader in surface functionalization of MOFs. Here, I explored MOFs as DDSs for small organic compounds with the idea of combining them with therapeutic mechanisms activated by near-infrared light.

This led to the conception of RADIOGENE project, the cornerstone of my current investigation, in which the MOF structure actively participates in conjunction with the cargo to obtain synergistic benefits in cancer treatment. In RADIOGENE, we surpass the limited depth penetrability of NIR light, introducing hafnium clusters that convert high-penetration X-rays into NIR light, which is then harnessed by porphyrin ligands to enable deep-tissue photodynamic therapy. Simultaneously, the MOF acts as a siRNA carrier, targeting overexpressed anti-stress mechanisms in tumour cells. This dual-action strategy aims to reduce effective radiation doses while minimising side effects in healthy tissues. To maximise biocompatibility and facilitate clinical translation, the siRNA is encapsulated via a one-step synthesis in which the MOF grows around the cargo, following the methodology developed in the Crystal and Engineering Lab (University of Valencia), where I currently lead the project.

The next phase of my research will expand this concept to a broader range of biological macromolecules, including proteins, siRNA, and antisense oligonucleotides (ASOs), while simultaneously exploiting MOF structural features for additional radiation-based therapies, such as Fenton-like reactions, local hyperthermia, or sonodynamic therapy.

Resumen del Currículum Vitae:

My scientific career reflects a multidisciplinary track record, including 27 published articles (8 as first author and 5 as corresponding), a h-index of 20 and 1224 citations, with 88 % of my papers in the top 25% most cited documents worldwide. I have acquired a Field-Weighted Citation Impact of 2.09, indicating that my publications have been cited more than twice as often as expected for my field. Additionally, I have co-authored a book chapter and participated in more than 20 conferences and congresses, including 3 as committee organiser and 2 as invited chair. I participated in outreach activities for children at Science CambFestival (2024) and Edelweiss school (2025). My research has also been recognised by awards such as "Valencia idea" (2015) or "City of Algemesi Technical-Scientific Award" (2022).

Throughout my career, I have consistently obtained competitive funding, most recently through the RADIOGENE project funded by the La Caixa Junior Leader Retaining Program. As principal investigator, this support has enabled me to recruit and mentor M. Bohoyo Pajuelo as a PhD student (ongoing). In addition, I have participated in over ten research projects, assuming diverse roles and responsibilities.

This includes PID2021-126304OB-C41, which enabled me to mentor and co-supervise Dr. Marcia Domínguez (PhD, Cum Laude, 2023) at the Polytechnic University of Valencia (UPV), as well as GENOMOF, in which I also acted as principal investigator and co-supervised Ms. Nathalie Taraby for her MSc in Advanced Chemistry at the University of Cambridge. I have additionally co-supervised Pablo Moreno (MSc) and two undergraduate students (including one international student) at the UPV. Currently, I am also co-supervising Alberto Martínez for his MSc thesis at the University of Valencia (ongoing).

My research experience spans multiple countries and institutions, including Spain, Japan and the United Kingdom, and research centres such as IDM, CIPF, IIS La Fe, UPV, IcMol and CEB. This international trajectory has allowed me to expand my research network and collaborate with renowned experts across the fields I have worked in, including V. I. Parvulescu, M. Serrano, P. Horcajada, and C. Kaminski, among others.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I am a co-inventor of a Global, European and national patent licensed by Opticalsens S.L., which now commercialises sensors through the brand Celentis®

I actively mentor students, giving lectures and practical training for official degree and MSc programs in Chemistry (Design, Chemical, Biomedical and Industrial Engineering (2015-2024) among all the institutions I have been affiliated with, delivering courses in Spanish, English, and Valencian. In line with my teaching activities, I hold official ANECA accreditations for Ayudante Doctor, Profesor Contratado Doctor, and Profesor de Universidad Privada.

Finally, I am a regular reviewer for JCR-indexed journals, including Colloids and Surfaces B: Biointerfaces and the International Journal of Biological Macromolecules



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PASCUAL MIELGO, JORGE
Referencia: RYC2025-056145-I
Correo Electrónico: jpascual1992@gmail.com
Título: Química en disolución e interfaces de perovskitas metálicas de haluro para aplicaciones optoelectrónicas

Resumen de la Memoria:

My scientific career has focused on understanding and engineering the chemistry, interfaces and crystallization of metal halide perovskites, with particular emphasis on environmentally sustainable, lead-free materials. I began my work at POLYMAT, where I investigated carbon nanomaterials as additives to improve perovskite thin-film quality, stability, and device performance. This period provided a solid foundation in perovskite synthesis, device fabrication, and advanced spectroscopies, and included a long collaboration with CIDETEC and a research stay at Helmholtz-Zentrum Berlin that strengthened my skills in device and interface engineering. My PhD produced nine publications, several oral contributions, and competitive funding as principal investigator.

After finishing my PhD, I joined Helmholtz-Zentrum Berlin as a postdoctoral researcher, where I specialized in the chemistry of tin-based perovskites. I identified a key degradation mechanism driven by conventional solvents and contributed fundamental insights into oxidation pathways, solvent and additive selection, and colloidal behaviour. I led the tin-based perovskite line within the group, supervised students, used multiple synchrotron beamlines, and contributed to large European and national projects. This stage produced seventeen publications, including my first corresponding-author works, and positioned me as an emerging reference in tin perovskite materials.

I then joined Kyoto University, where I expanded my expertise to mixed tin-lead materials and perovskite interfaces. I contributed to the development of high-quality narrow-bandgap perovskites used in record tandem solar cells, published in a leading journal. I also helped develop a universal interfacial treatment applicable across compositions, further consolidating my international visibility.

Since 2023 I have continued my research at POLYMAT through two competitive fellowships. My current work integrates interface engineering with a deep chemical understanding of precursor solutions. This period has resulted in eleven publications, multiple invited talks, several seminars and four corresponding-author papers. I have strengthened my international profile through research visits to China and Brazil and through active collaborations with leading groups in Europe, Asia and Latin America.

My proposed future research line builds directly on this trajectory. Lead-free tin perovskites are limited by intrinsically challenging crystallization dynamics that restrict substrate compatibility, solvent selection and large-area processing. I will establish a new research direction focused on understanding and controlling the coupled interactions between precursor solutions and engineered substrate surfaces. By rationally designing non-oxidizing solvent systems and functionalized interfaces, I aim to create new crystallization pathways that enable reproducible, scalable tin-based perovskite photovoltaics. This approach will generate general principles for surface-controlled crystallization, bridging fundamental chemistry with practical device engineering and allowing the fabrication of efficient large-area devices.

The RyC grant will provide the stability and resources necessary to consolidate this line of research, establish a competitive independent group, and position Spain as a reference in sustainable perovskite photovoltaics.

Resumen del Currículum Vitae:

I am a chemist specializing in the design, processing and characterization of metal halide perovskites, with a strong focus on sustainable tin-based and mixed tin-lead materials. My scientific output includes 45 indexed publications, 43 of them in Q1 journals, with twelve as first author and six as corresponding author. My work has accumulated more than 2600 citations and an h-index of 25. I have contributed to high-impact publications in leading journals including Nature, Nature Reviews Materials, Chemical Reviews, Angewandte Chemie and Nature Energy. My contributions span fundamental chemistry, solution design, colloidal characterization, interface engineering and device fabrication.

My career includes competitive fellowships and contracts in Spain, Germany and Japan, and a cumulative international experience of over 3.5 years. I have held postdoctoral positions at Helmholtz-Zentrum Berlin and Kyoto University, and I currently hold an MSCA-COFUND fellowship at POLYMAT. I have participated in major European and national projects, including an ERC Starting Grant and large-scale collaborative initiatives exceeding eight million euros. As principal investigator, I have secured five competitive projects and fellowships, both national and European.

Throughout my career I have demonstrated leadership and independence by supervising multiple PhD, MSc and BSc students, publishing as corresponding author, and leading research lines on tin-based perovskites in internationally recognized groups. I have delivered invited talks at international conferences, given seminars in Europe, Asia and Latin America, and organized three symposia in major international meetings. I serve as reviewer for high-impact journals and have been invited to evaluate manuscripts for Nature, Nature Energy, Nature Photonics, Nature Communications and ACS Energy Letters, among others.

My scientific expertise combines solution chemistry, NMR spectroscopy, synchrotron characterization, crystallization mechanisms and interface engineering. I am an experienced user of advanced facilities including beamlines at BESSY II and LNLS, and have contributed to multiple collaborations with industry and academia across several countries. I maintain an active international network with leading groups in Germany, Japan, China, Italy, Brazil and the United Kingdom.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Beyond research, I am committed to open science: more than half of my papers are openly accessible, and the rest are deposited in repositories following FAIR principles. I participated in the development of a global open-access perovskite solar cell database, widely used across the field. My background includes formal training in mass spectrometry, polymer science and scientific software, and I am fluent in several languages, supporting my international research activities.

My trajectory demonstrates strong scientific productivity, leadership and independence, as well as a clear capacity to establish a competitive research program aligned with the objectives of the Ramón y Cajal programme.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales

Nombre: ALIZADEH, REZA

Referencia: RYC2025-055076-I

Correo Electrónico: r.alizadeh@sharif.edu

Título: Assistant professor

Resumen de la Memoria:

My career in physical metallurgy and materials science has been defined by methodological innovation, international collaboration, and sustained leadership in alloy design and characterization. Beginning with my BSc and MSc studies at the University of Tehran, I pioneered localized testing methodologies such as the Shear Punch Creep Test (SPCT), now adopted internationally for evaluating creep properties in scarce alloys. During my PhD, co supervised by Professors Terence Langdon (Southampton/USC) and Alfonso Ngan (HKU), I advanced understanding of superplasticity in Mg alloys, achieving record grain refinement through severe plastic deformation and clarifying grain boundary sliding mechanisms. This work produced ten high impact publications and established my expertise in deformation mechanisms of light alloys.

Postdoctoral research at IMDEA Materials Institute (Spain) under Professor Javier Llorca further consolidated my international profile. I led experimental investigations on dislocation-precipitate interactions in Mg Zn alloys and slip transfer at grain boundaries in Al, combining micro pillar compression with advanced microscopy and modeling. These studies yielded highly cited publications in Acta Materialia, Scripta Materialia, and International Journal of Plasticity, and remain benchmarks in crystal plasticity modeling. My fellowships included the Juan de la Cierva (ranked 1st in Materials Science) and AMAROUT II Europe, reflecting competitive recognition at the European level.

Since 2019, as Assistant Professor at Sharif University of Technology, I have established the Light Alloys Laboratory and founded the ALIZADEH Group, now one of Iran's most active biomaterials teams. Leading ~20 students, I have supervised more than 35 BSc, MSc, and PhD researchers, many of whom now hold prestigious PhD positions abroad. Our group has produced 39 publications mainly in Q1 journals, advancing topics from biodegradable Mg and Zn alloys to additive manufacturing of PLA based composites. These projects bridge fundamental metallurgy with biomedical innovation, supported by national grants and industry collaborations.

My trajectory demonstrates independence and leadership: founding a laboratory, securing competitive grants, mentoring students, and initiating international collaborations with institutions in Spain, USA, UK, Canada, and China. Editorial service as Guest Editor (Metals), Youth Committee Member (Journal of Magnesium and Alloys), and reviewer for leading journals further reflects international recognition. I have delivered keynote lectures at major conferences (iMat 2025, UFGNSM 2024) and personally organized 30 international webinars, enhancing global visibility for my department.

The line of research I propose builds on this foundation: microstructure driven design of sustainable light alloys, integrating severe plastic deformation, additive manufacturing, and surface engineering to tailor mechanical and degradation properties for energy and biomedical applications. By consolidating my expertise in deformation mechanisms, innovative testing, and biomaterials, I aim to establish in Spain a hub for sustainable alloy design that connects fundamental science with industrial translation, while training the next generation of materials scientists.

Resumen del Currículum Vitae:

I am an Associate Professor of Materials Science and Engineering at Sharif University of Technology, with over nineteen years of experience in physical metallurgy, alloy design, and biomaterials. My career has been defined by methodological innovation, international collaboration, and sustained leadership.

I earned my BSc, MSc, and PhD at the University of Tehran, pioneering the Shear Punch Creep Test (SPCT) for scarce alloys and advancing superplasticity research in Mg alloys through collaborations with Southampton and Hong Kong. My doctoral work produced ten high impact publications and established expertise in deformation mechanisms of light alloys. Postdoctoral research at IMDEA Materials (Spain) under Prof. Javier Llorca consolidated my international profile, yielding benchmark studies on dislocation-precipitate interactions and slip transfer in Al, supported by competitive fellowships including Juan de la Cierva (ranked 1st in Materials Science) and AMAROUT II Europe.

Since 2019, I have founded the Light Alloys Laboratory and ALIZADEH Group, now one of Iran's most active biomaterials teams. Leading ~20 students, I have supervised 30 BSc, 19 MSc, and 2 PhD researchers, many of whom secured prestigious PhD positions abroad. Our group has produced 39 Q1 publications, advancing biodegradable Mg/Zn alloys, PLA based composites, hydrothermal coatings reducing degradation rates by up to 90%, constitutive models for hot deformation, and 3D printed scaffolds with enhanced mechanical and biological performance. These projects bridge fundamental metallurgy with biomedical innovation, supported by national grants and industry collaborations with Mobarakeh Steel, Gol Gohar Mining, and Razi Metallurgy Research Center.

My contributions have been recognized with multiple awards, including the Young Researcher Award (Iranian Academy of Sciences, 2025), Top Professor in Research and Education at Sharif University, and inclusion among the Top 2% most cited scientists worldwide (Stanford/Scopus). To date, I have published 69 articles with over 2,880 citations (h index: 32). Editorial service as Guest Editor (Metals), Youth Committee Member (Journal of Magnesium and Alloys), and reviewer for leading journals further reflects international recognition.

I have delivered keynote lectures at major conferences (iMat 2025, UFGNSM 2024) and personally organized 30 international webinars, enhancing global visibility for my department. My current role as Vice Dean for International Relations underscores my commitment to building global networks and fostering institutional partnerships.

Looking forward, my research aims to establish a hub in Spain for microstructure driven design of sustainable light alloys, integrating severe plastic deformation, additive manufacturing, and surface engineering to tailor mechanical and degradation properties for energy and biomedical applications, while training the next generation of materials scientists.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: AJEJAS BAZÁN, FERNANDO
Referencia: RYC2025-055214-I
Correo Electrónico: Ferajejas@hotmail.com
Título: From classical spintronics to new and emerging spintronics

Resumen de la Memoria:

My research line is devoted to the study and engineering of novel spintronic phenomena in thin films and heterostructures, combining fundamental physics with technological applications. A central focus has been the stabilization and control of chiral magnetic textures, particularly skyrmions, in synthetic antiferromagnets and ferromagnetic multilayers. Through materials design, I achieved room-temperature and zero-field stabilization of sub-20 nm skyrmions, demonstrating their potential for high-density, low-power magnetic recording and computing. These results were obtained by integrating advanced growth techniques with magnetometry, Kerr microscopy, MFM, synchrotron spectroscopy, and micromagnetic simulations, leading to pioneering publications in Nature Materials and APL Materials.

Another major axis of my work is the investigation of interfacial Dzyaloshinskii-Moriya interaction (DMI) and Rashba effects at FM/HM interfaces. I showed how domain wall dynamics and effective DMI can be tuned by interfacial composition, correlating DMI strength with potential gradients and work functions. In parallel, I explored graphene-based spintronics, revealing sizeable DMI and giant perpendicular magnetic anisotropy in epitaxial Pt|Co|graphene heterostructures. Synchrotron experiments demonstrated orbital hybridization effects responsible for enhanced anisotropy, opening new pathways for spin transport in light-element systems.

My research also extends to antiferromagnetic spintronics and neuromorphic computing. At UC San Diego, I developed hybrid systems combining vanadium oxides with ferromagnets and antiferromagnets, enabling electrical control of exchange bias and coercivity, as well as current-driven switching of the Néel vector. These results highlight the role of magnons at HM|AFM interfaces in controlling FM properties, pointing toward robust, low-energy spintronic devices. More recently, I have focused on maximizing spin-orbit torques in metallic heterostructures with Rashba interfaces, achieving strong interfacial contributions and enabling skyrmions with high velocities.

Beyond stabilization and control, I have contributed to the electrical detection of non-collinear spin textures, including synthetic antiferromagnets and individual skyrmions, through magnetotransport and thermoelectric measurements. I have also investigated magnetoresistance responses and their correlation with magnetization reversal processes, demonstrating how anisotropy design dictates MR outputs, and engineered anisotropic magnetoresistance in half-metallic manganites (LSMO) for spintronic sensing applications.

Finally, I have contributed to the development of advanced instrumentation, including a multi-purpose UHV growth and spectroscopy laboratory and a unique magneto-optical Kerr system capable of simultaneous acquisition of hysteresis loops and magnetotransport signals.

Overall, my research integrates fundamental studies of interfacial interactions, magnetic anisotropies, and spin dynamics with applied innovation in skyrmionics, antiferromagnetic spintronics, neuromorphic architectures, and orbitronics, aiming to advance spintronics toward next-generation information technologies.

Resumen del Currículum Vitae:

I completed my PhD (2014-2017) in Condensed Matter Physics and Nanotechnology at Universidad Autónoma de Madrid and IMDEA Nanoscience, under the supervision of Prof. Rodolfo Miranda, Prof. Julio Camarero, and Dr. Paolo Perna. My work focused on UHV growth and characterization of metallic and hybrid multilayers using sputtering, MBE, CVD, and PLD, complemented by UPS-XPS, LEED, synchrotron techniques (XAS-XMCD, XRRS, SP-ARPES), and magneto-optical Kerr measurements. Short stays at CNRS-Institut Néel (Grenoble) and CNRS-GREYC (Caen) expanded my expertise in Kerr imaging and oxide thin films.

From 2018 to 2021, I joined Laboratoire Albert Fert (CNRS-Thales, France) as a postdoc in the skyrmion team, supervised by Dr. Vincent Cros, Dr. Nicolas Reyren, and Prof. Albert Fert. I worked on magnetic multilayers hosting chiral spin textures (domain walls, spirals, skyrmions), performing magnetometry (AGFM, SQUID), MFM imaging, and Kerr microscopy to study Dzyaloshinskii-Moriya interaction and Rashba effects. This period included collaborations with CNRS labs, synchrotron and neutron beam times, and international conferences.

My second postdoc at UC San Diego (with Prof. Ivan K. Schuller) focused on hybrid systems for neuromorphic computing, including Pt|Co|V₂O₅|Co|Pt multilayers, FM|AFM heterostructures, goniopolar materials, and correlated oxides. I carried out growth and characterization (SQUID, nano-MOKE, XRD/XRR, Hall, R_T).

Since 2023, I am a tenure-track PI at IMDEA Nanoscience with a Comunidad de Madrid "Atracción de Talento" grant (2023-2028), leading a group on antiferromagnetic spintronics, neuromorphic computing, altermagnetism, magnonics, and orbitronics. I have published 38+ peer-reviewed articles (H-index 18, >1450 citations), contributed to 16+ international conferences, 9 projects, and 20+ synchrotron experiments. I have co-supervised PhD/Master students and reviewed for leading journals. Notable works include current-driven switching of Néel vectors in antiferromagnets, giant Rashba spin-orbit torque in metallic heterostructures, and stabilization of skyrmions at zero field and room temperature. My career combines fundamental research with device-oriented innovation, advancing spintronics and neuromorphic computing toward future applications.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: ALI, FAIZAN
Referencia: RYC2025-054471-I
Correo Electrónico: faizanmesp@gmail.com
Título: Ferroelectric Fluorites for Memory, Energy Storage, and Thermal-Energy Conversion
Resumen de la Memoria:

My research trajectory is defined by a coherent and progressive exploration of ferroelectric fluorite-structured oxides, spanning fundamental mechanisms, reliability physics, and device-oriented functionalities. It has evolved through the following scientific lines:

1. Energy storage properties of fluorite ferroelectric films: Demonstrated high recoverable energy density in HfO₂-based thin films and clarified how frequency, temperature, and cycling affect storage performance and stability. These insights established early structure-property relationships that motivated my long-term interest in thermal-electrical conversion.
2. Reliability and intrinsic ferroelectricity in epitaxial HfO₂ films: Clarified how interface symmetry, strain, and oxygen activity stabilize intrinsic ferroelectric polarization and distinguished genuine switching from leakage artefacts. Resolved two key reliability-performance dilemmas in fluorite ferroelectrics -- (i) endurance-polarization and (ii) endurance-retention, by identifying growth/processing routes that improve all three simultaneously.
3. Switching dynamics in polycrystalline and epitaxial HfO₂: Demonstrated sub-60 ns switching and resolved the long-standing polarization-speed trade-off, providing insight relevant for FeRAM, FeFET, and neuromorphic device architectures.
4. Energy-functional epitaxial HfO₂/ZrO₂ films: Developed new doped and epitaxial films for pyroelectric energy harvesting and solid-state cooling, investigating temperature-dependent polarization, thermal responsivity, and stability under cyclic thermal loads.
5. AI-assisted prediction of ferroelectric behaviour: Developed machine-learning models capable of predicting polarization, switching dynamics, and endurance from processing parameters, enabling data-driven optimization of fluorite-structured ferroelectrics.

Together, these research lines define a coherent trajectory toward establishing energy-functional fluorite ferroelectrics as scalable materials for next-generation microelectronics, autonomous sensing, and on-chip thermal management. The Ramón y Cajal fellowship will enable me to consolidate these research lines, build a leading group on energy-functional fluorite ferroelectrics, and position Spain at the forefront of pyroelectric energy harvesting and solid-state cooling technologies.

Resumen del Currículum Vitae:

My research focuses on ferroelectric fluorite-structured materials for next-generation memory and energy technologies, including non-volatile memories, energy storage, pyroelectric harvesting, and solid-state cooling. I work at the interface of materials science, microelectronics, and AI-driven modelling, linking structure-property mechanisms with device-level performance. I have authored 36 peer-reviewed publications, including 14 as first/corresponding author, with >3100 citations and an h-index of 17 (Google Scholar), with most papers in Q1 journals such as Advanced Functional Materials, Nano Energy, and Small. My multidisciplinary background, spanning electrical engineering, microelectronics, thin-film growth, device physics, and machine learning, enables me to connect fundamental materials design with technologically relevant device functionalities.

I have consolidated scientific independence through highly competitive fellowships, including the Marie Skłodowska-Curie Postdoctoral Fellowship (MSCA-PF) and the Juan de la Cierva-Formación Fellowship, both supporting research lines conceived and executed by me. I have established two research lines at my host institute: (i) energy-functional fluorite ferroelectrics (pyroelectricity, energy storage, electrocaloric effects) and (ii) AI-assisted prediction of polarization, switching, and reliability in HfO₂-based films. These research lines form the foundation of the RYC proposal, which aims to establish a leading program on energy-functional fluorite ferroelectrics in Spain. I have served as PI or Co-PI for several projects in Asia and Europe. Across my PI/Co-PI roles and participation in national and European consortia, I have contributed to more than 3.3 M€ of competitive research funding, including ~360 k€ led directly as PI or Co-PI.

I maintain strong international collaborations with leading teams and industry partners, including Fraunhofer IPMS and the Ferroelectric Memory Company (Germany), the Luxembourg Institute of Science and Technology (LIST), and academic groups in South Korea, China, and Europe. My research stays at Fraunhofer IPMS (Germany), Sejong University and Hanyang University (South Korea), and the Chinese Academy of Sciences strengthened my experimental expertise, industrial perspective, and international network.

I have supervised eight undergraduate theses, two ongoing Master's theses, and one PhD thesis. I coordinate measurement workflows in the electrical characterization laboratory at ICMAB-CSIC and regularly review for high-impact journals. I have accumulated 540 hours of accredited teaching experience as a Lecturer at the University of Sanya (China) and have enhanced international visibility through invited talks and participation in major conferences.

Overall, my career demonstrates sustained scientific productivity, competitive funding success, international collaboration, and technological relevance. My independent research lines on energy-functional fluorite ferroelectrics and AI-assisted materials design position me to make significant contributions to Spain's strategic priorities in microelectronics, sustainability, and advanced materials engineering.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: FERNANDES GOUVEIA, AMANDA
Referencia: RYC2025-055632-I
Correo Electrónico: gouveiad@uji.es
Título: Theory-Driven Design of Semiconductor Materials for Photocatalysis and Environmental Remediation
Resumen de la Memoria:

My scientific career has been defined by the development of an independent and internationally recognized research line on semiconductor materials, focused on understanding how morphology, surface chemistry, and electronic structure govern functional properties, with emphasis on photocatalysis and environmental remediation. Since completing my Ph.D. in 2018, I have built a trajectory that integrates experimental synthesis, advanced characterization, and density functional theory (DFT) calculations to establish structure-property-reactivity relationships, particularly those governed by surface-dependent phenomena.

I consolidated this expertise through competitive postdoctoral positions in Brazil, Spain, and France, as well as research stays in recognized laboratories in Argentina and Brazil. Across these appointments, I assumed leadership roles in the design of theoretical models, interpretation of experimental data, and development of new methodologies such as morphology mapping and surface-termination analysis. My independence is demonstrated by multiple corresponding-author publications, senior (last) authorships, and papers produced without the involvement of my former supervisors, including studies that clarified long-standing questions about morphology-controlled reactivity in semiconductors.

My international experience includes sustained collaborations with research groups in France, Spain, Brazil, and Argentina, the coordination of competitive funded projects as principal investigator, and the supervision of students from Brazil, Spain, and France. I have also contributed to scientific training through invited workshops and hands-on sessions in DFT and computational chemistry at Sorbonne University and international scientific meetings. In 2024, I was awarded a Marie Skłodowska-Curie Postdoctoral Fellowship at Sorbonne University, where I lead the TREX-MPs project, further strengthening my position as an independent researcher in Europe.

The research line I aim to develop focuses on designing next-generation photocatalysts for the degradation of microplastics (MPs). This agenda builds directly on my expertise in semiconductor surfaces, morphology-dependent properties, and reactive oxygen species (ROS) formation. By integrating periodic surface models with targeted experiments, my objective is to establish the fundamental principles that control the photocatalytic degradation of MPs mediated by ROS. This work is aligned with major EU priorities on sustainability and zero pollution and has strong potential for transfer to wastewater treatment technologies.

Overall, my trajectory reflects a consistent, coherent, and autonomous development of expertise at the interface of materials chemistry, computational modelling, and environmental technologies. The Ramón y Cajal program offers the ideal framework to consolidate my research group, expand my international network, and advance theory-driven strategies for designing semiconductor materials with societal and environmental impact.

Resumen del Currículum Vitae:

I am a chemist specializing in materials science, with expertise in the theoretical and experimental investigation of semiconductor surfaces, morphology-dependent properties, and photocatalytic processes. My scientific career is marked by strong international mobility, multidisciplinary collaboration, and the progressive consolidation of an independent research line. Since obtaining my Ph.D. in 2018, I have completed competitive postdoctoral contracts in Brazil and Spain, and I am currently a Marie Skłodowska-Curie Postdoctoral Fellow at Sorbonne University (France).

I have authored publications in leading journals across materials science, physical chemistry, environmental engineering, and computational chemistry. In many of my recent works, I served as corresponding author or senior (last) author, including publications conducted entirely independently from my former supervisors. My contributions include the development of theoretical models for morphology control, surface-termination analysis, defect engineering, and reactive oxygen species formation on oxide surfaces. These studies have advanced the understanding of structure-activity relationships in semiconductors and supported the design of materials for photocatalysis, sensing, and antimicrobial applications.

My international experience includes extended research stays in Argentina and Brazil, in which I led efforts to integrate density functional theory calculations with microscopy, spectroscopy, and materials synthesis. I have participated as principal investigator or co-investigator in competitive research projects funded by European, Spanish, and Brazilian agencies (MSCA, Generalitat Valenciana, FAPESP, CNPq). These projects demonstrate my capacity to secure funding, coordinate international teams, and define coherent scientific strategies.

I have supervised undergraduate, Master's, and Ph.D. students, contributing to the development of early-career researchers. I have delivered invited workshops, hands-on computational chemistry sessions, and training activities at Sorbonne University and in international scientific meetings. My teaching experience exceeds 400 hours across undergraduate and postgraduate programs in Spain and Brazil, supported by formal pedagogical certification (200 hours) at Universitat Jaume I.

Throughout my career, I have received several distinctions, including the Nano-Micro Science Innovation Award (South Korea), Best Poster Awards in Brazil and France, and recognition as a finalist for the Rising Stars in Computational Materials Science prize. I have also contributed to public outreach through articles in "The Conversation2", invited lectures, and educational initiatives such as "Ludo Educativo", reinforcing the societal dimension of my research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Across all stages of my trajectory, I have maintained a coherent, innovative, and autonomous line of work centered on the relationship between morphology, surface structure, and reactivity. My current efforts extend this expertise to one of today's most pressing environmental challenges: the photocatalytic degradation of microplastics. Through the Ramón y Cajal program, I aim to consolidate an independent research group in Spain dedicated to theory-driven design of semiconductor materials with broad environmental and technological impact.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: CASANOVA CHAFER, JUAN
Referencia: RYC2025-055883-I
Correo Electrónico: casanovachafer@gmail.com
Título: Nanomaterials engineering for advanced environmental air-quality monitoring

Resumen de la Memoria:

My research trajectory has centered on two-dimensional nanomaterials for chemical gas sensors, integrating innovative synthesis, advanced characterization and device fabrication. My work bridges fundamental research on nanomaterial properties with applied science, addressing critical challenges in environmental monitoring and industrial safety. This trajectory reflects a commitment to pushing the boundaries of knowledge in nanotechnology while ensuring societal and industrial relevance.

I began at the Mediterranean Center for Environmental Studies (CEAM, 3 months), developing atmospheric analysis methodologies (SPE, LC-MS, PTR-MS) and experiments in EUPHORE chambers, strengthening my expertise in atmospheric chemistry. Subsequently, at the Molecular Recognition Center (IDM, University of Valencia, 3 months), I assessed tobacco/vaping impacts on indoor air quality using commercial sensors, marking my first practical sensor experience and publishing my first first-author article (Microchemical Journal, 2016).

During over 6 years at Universitat Rovira i Virgili (URV), I progressed from research fellow (2016) to PhD (2017-2020) and postdoc (2020-2022) in the MINOS group. During my PhD I have developed nanomaterials (e.g., perovskites, diamondoids, graphene hybrids) for high-performance gas sensors, yielding 10 publications and earning Summa Cum Laude and Extraordinary Doctoral Award. As postdoc, I consolidated this line, supervising PhD student Ayoub Alouani (defended 25/07/2025 with honors) and securing >€1M in competitive projects as researcher team member (e.g., H2020-RISE SENSOFIT, PDC2022, TED2021). A 3-month stay (2019) at Université de Mons (ChIPS) gave me XPS, TOF-SIMS and plasma expertise, resulting in 2 co-publications. After some years, as PI of MSCA-PF GREBOS (€191,760; 2023-2025), I established a gas sensing research unit at UMONS, publishing 15 Q1 articles and securing additional funding (Margarita Salas, FNRS). A stay at Chiba University (Japan) in 2024 with Prof. Ichikuni enabled synthesis of NaTaO₃ perovskites; his student Masato Yanagi (2025-2028) now pursues his PhD in my UMONS unit. More recently, I have secured additional competitive funding as PI of a JSPS project at Kumamoto University (Japan). As a result, I secured about €330,000 in competitive funding as Principal Investigator (PI) across multiple European and Asian programs

Future research line (MXenes): With the RyC, I will develop semiconducting MXenes via scalable HF-free synthesis and controlled functionalization. I will study structure-electronic property-response relationships via operando synchrotron XPS, fabricate miniaturized low-power chemiresistive sensors for NO₂/NH₃/VOCs, and validate under realistic conditions. MXenes present outstanding properties as tunable bandgap and charge-transfer dynamics, potentially overcoming the limitations of previous nanomaterials. Expected impacts: (i) Scientific: new semiconducting MXene materials and design rules; (ii) Environmental: distributed air-quality monitoring supporting EU directives; (iii) Technological/economic: compact sensors, patents, and potential creation of a new spin-off.

With the RyC, I aim to establish an independent research group in Spain dedicated to developing innovative nanomaterials for sensing applications, reinforcing Spain's position as a leader in environmental and nanotechnology research.

Resumen del Currículum Vitae:

Juan Casanova-Chafer obtained his PhD from Universitat Rovira i Virgili (Spain) in 2020, earning the Extraordinary Doctoral Award and Summa Cum Laude distinction. His research focuses on the engineering of low-dimensional nanomaterials for gas sensing applications, with particular emphasis on elucidating sensing mechanisms and gas/surface interactions relevant to air-quality monitoring and industrial emissions. He has pioneered the development of nanomaterials such as diamonds, perovskite nanocrystals, and metallic clusters for gas sensing uses.

To date, he has secured about €330,000 in competitive funding as Principal Investigator (PI) across multiple European and Asian programs, demonstrating his capacity to lead independent and internationally resourced projects. For instance, he has been PI of a Marie Skłodowska-Curie project at Université de Mons in Belgium. He previously secured funds as PI of a Margarita Salas program. He has recently been selected as PI of a JSPS project at Kumamoto University (Japan), reflecting his international competitiveness and his capacity to attract competitive funding abroad. He has been shortlisted in highly competitive programs, including placement 4th on the reserve list in the 2024 Ramón y Cajal call and as a finalist in the La Caixa Junior Leader program.

He has co-authored 54 peer-reviewed publications (h-index: 19). His trajectory is characterised by scientific leadership, reflected by his authorship positions: first author in 21 publications, unique author in 3 papers, and corresponding author in 14 publications. Besides, he has 16 publications as second author, revealing a strong commitment to mentoring PhD students and visiting researchers.

His scientific contributions have been recognized with prestigious awards, including the Seal of Excellence from the European Commission (2022), and achievements for innovation such as the runner-up position at the ISOCS/IEEE "Sniffest Competition" (2017). Juan has presented his research findings at 27 international conferences. He also consolidated expertise in advanced synchrotron facilities as SOLARIS (Poland), MAX IV (Sweden) and ALBA (Spain).

Juan's research has a strong technological and societal orientation. As lead inventor of two international patents that have been transferred to the spin-off company NanoChronia S.L. and are under commercial exploitation. He has contributed to the establishment and early development of this technological company focused on advanced gas sensing for agricultural solutions. He provided hands-on technical guidance and support in fundraising programs such as The Collider (Mobile World Capital Barcelona). Furthermore, his work with industrial partners (e.g. Gnanomat (Spain), JLM Innovation (Germany) and VOCsSens (Belgium)) has led to joint publications and the development of prototypes for environmental and safety monitoring.

Juan has supervised the PhD thesis of Ayoub Alouani, successfully defended in July 2025, and has mentored several visiting and early-career researchers. He actively disseminates his results through invited talks, conferences and outreach activities such as European Researchers' Night and school engagement. His service to the scientific community also includes acting as reviewer for high-impact journals and editorial activities such as guest editing of special issues.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: RODRIGUEZ MARTINEZ, XABIER
Referencia: RYC2025-056830-I
Correo Electrónico: xabier.rodriguez@udc.es
Título: High-throughput experimentation and machine-learning in organic electronics toward sustainable energy harvesting

Resumen de la Memoria:

Dr. Xavier Rodríguez-Martínez (XRM) began his research career at the Materials Science Institute of Barcelona (ICMAB-CSIC) as a materials processing engineer (BSc project, 2014) and later as Raman spectroscopist (MSc thesis, 2015). His PhD thesis on the Development of organic solar cells by combinatorial methods (2016-2020) introduced a high-throughput experimentation (HTE) platform for the optimization of said photovoltaic devices. His collaborators from Imperial College London and himself contributed to the field of Raman spectroscopy in soft condensed matter by introducing a framework to quantify the thickness and composition of multi-component films. Supported by his collaborators at ETH Zürich, he introduced a novel processing scheme to readily generate solid-state parametric libraries of thickness and composition in an orthogonal fashion, which combined microfluidic mixers with a blade coating applicator. These were exploited together with quantitative Raman and photocurrent mapping to rapidly screen the parametric space of binary and ternary organic solar cells (OSCs), thus positioning XRM as a recognized expert in HTE methods. His expertise was further extended by learning advanced statistics and artificial intelligence (AI) methodologies for data science. He regularly visited Rovira i Virgili University and enrolled in international summer schools on AI and data-driven analysis methods for scientists. As a result, his collaborators and himself pioneered the exploitation of AI models in HTE datasets, which revealed an outstanding capability to predict the performance of OSCs upon donor:acceptor material choices and composition. In parallel, he collaborated in organic thermoelectric (OTE) projects in his host PhD group while mastering the thermal conductivity characterization of conjugated polymer films (3w and Raman thermometry).

During his first postdoc in Linköping University, he pursued his research on (laminated) OSCs closer to industrial scenarios (air processing, flexible devices, all-printed modules) and applications (such as indoors and building-integrated, e.g., agrivoltaics). Following, Dr. Rodríguez-Martínez earned a Humboldt postdoctoral fellowship in Heidelberg University to extend his expertise on OTE by working on novel composites based on aligned conjugated polymers and single-walled carbon nanotubes.

The expertise gained throughout his career at the leading Spanish institutions (ICMAB-CSIC) and two internationally renowned foreign centres (Linköping University and Heidelberg University) has been instrumental in shaping and consolidating his research line. Now based at the University of A Coruña, his work focuses on organic photovoltaic materials for sustainable energy applications. His research line will exploit automated (robotized) laboratories for the accelerated discovery of OSC materials in-line with the demands of up-scaling (e.g., for naval mobility and agrivoltaics). These include the use of non-halogenated solvents, low synthetic complexity materials and air-resilient semiconductors. He will exploit high-throughput and accelerated stability test benches while evoking AI to both guide experimentation on-the-fly and extract new data-driven device physics. These will retrieve structure-property relationships on how to design new OSC materials with improved stability merits.

Resumen del Currículum Vitae:

Dr. Xavier Rodríguez-Martínez (XRM) is a materials scientist focused on advancing energy harvesting technologies toward a decarbonized electricity supply. His research efforts are centred on two areas which exploit organic semiconductors (conjugated polymers, small molecules and carbon nanotubes) in the energy conversion process: photovoltaics and thermoelectricity. XRM completed his bachelor (2014) and master (2015, with an awarded scholarship from Fundació Catalunya-La Pedrera) degrees in nanotechnology and nanomaterials in the Autonomous University of Barcelona (UAB). In 2020, he was awarded a cum laude PhD (including the Special Award for Doctoral Studies) in materials science from the same university for his work at the Materials Science Institute of Barcelona (ICMAB-CSIC). During his PhD, XRM developed a distinctive profile as spectroscopist (Raman and ellipsometry), high-throughput experimentalist and data scientist focused mostly on organic photovoltaics. In early 2021, he moved to Linköping University, Sweden, as postdoctoral researcher for 21 months. His research interests gained a strong industrial bias as he worked in close collaboration with Epishine AB, a spinoff that prints organic solar modules for indoors. In November 2022, XRM became Alexander von Humboldt postdoctoral fellow at the Institute for Physical Chemistry in Heidelberg University, Germany, where he was co-principal investigator (PI) of his own original project (87.800€, 24 months) and supervised 1 internship student. In 2024, Dr. Rodríguez-Martínez earned a MSCA Postdoctoral Fellowship (204k€) that he did not execute in favour of his present UDC-Inditex InTalent Fellow position in the University of A Coruña. Therein, he assembled and leads a lab devoted to organic solar cell fabrication and deployment of machine-learning algorithms while supervising 1 PhD student and already supervised 1 BSc student. He also submitted his own research proposals, including an ERC Starting Grant as PI (A score, 1st on reserve list, 1.5M€), and 2 granted European projects as co-PI: 1 MSCA Doctoral Network (282k€) and 1 EIC Pathfinder Open (417k€). He will then supervise 1 additional PhD student and mentor 1 postdoc. XRM is co-author of 29 peer-reviewed articles (corresponding author in 9 of them) and features an h-index of 14, with 949 Web of Science citations (33 per article, 86 per year) and a steadily growing citation record. His papers have been published in excellent multidisciplinary journals such as Advanced Materials (1 publication), Energy & Environmental Science (4 publications), Advanced Energy Materials (4 publications, including 1 front cover) and Advanced Functional Materials (4 publications). He has participated in 20 international conferences and workshops in the form of talks (10), posters (5, with 1 best poster award) and invited keynotes (5). XRM has drafted several dissemination articles for the general public (e.g., in ICMAB and CSIC's webpages) and participated in radio interviews (e.g., in Radio Nacional de España). He has a mature track record as a reviewer, demonstrating peer recognition in the field of materials science and nanotechnology (e.g., in Advanced Materials and Advanced Energy Materials, among others) and as remote referee for the European Research Council (Advanced Grant 2023 call) and the American Chemical Society PRF New Directions Grants.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales

Nombre: GENÇ , AZİZ

Referencia: RYC2025-054926-I

Correo Electrónico: azizgenc@gmail.com

Título: Senior Researcher

Resumen de la Memoria:

My research during this post will focus on addressing key issues in the structure-property correlation of atomic-scale materials, enabling to design new functional materials for plasmonics and catalysis with tailored performances. We will develop 1D single-atom arrays (SAAs) of Ag and Pd within the tunnel structures of tungsten oxide nanowires (TONWs). The quantum plasmonic and phononic characteristics of these novel materials will be investigated using monochromated electron-energy loss spectroscopy (EELS) in an aberration-corrected scanning transmission electron microscope (AC-STEM). Furthermore, we will correlate the operando catalytic properties of the developed metallic SAAs for CO₂ hydrogenation at the atomic scale using in-situ AC-STEM and analyse the effects of plasmon enhancement on the catalytic mechanism.

My goal is to investigate the plasmonic and phononic characteristics of metallic single-atom arrays (SAAs) within the tunnel structures of metal oxides using monochromated EELS, taking advantage of the ultrahigh-energy resolution achieved by state-of-the-art monochromated STEM equipment. As the proposed research activity aims to investigate the plasmonic properties of SAAs, it is essential to consider the quantum effects, i.e. quantum plasmonics. Thus, investigating the plasmonic properties of metallic SAAs in 1D tunnel structures of TONWs will provide pioneering information about the behaviour of these engineered atomic structures. It is well-known and exploited that oxygen-deficient tungsten oxide nanostructures can exhibit plasmonic properties due to increased carrier density. In addition to reporting the plasmonic properties of metal SAAs arrays within the stoichiometric tungsten oxide (WO₃) nanowires, we will study the interaction of plasmonic fields of oxygen-deficient tungsten oxide and SAAs of Ag and Pd. This will be achieved by reducing the synthesized Ag and Pd SAAs in TONWs under a hydrogen atmosphere at low temperatures of around 200 oC.

The state-of-the-art equipment we plan to use during the planned research activities can provide energy resolutions below 25 meV. We will investigate the phononic properties of tungsten oxide nanostructures and their interaction with the Ag and Pd single atomic arrays within these structures, along with the effects of different oxygen vacancies within the sub-stoichiometric tungsten oxide nanostructures. Reporting on the atomic-level modification of the phonon modes of tungsten oxide nanostructures by the presence of metallic single atom arrays of Ag and Pd will provide novel information in the general field of phononics.

As a proof of concept for the utility of the plasmonic Ag and Pd SAAs in TONWs developed during the proposed research activity, we will correlate the operando catalytic properties of the developed novel nanostructures for CO₂ hydrogenation at the atomic scale using in-situ AC-STEM and analyse the effects of plasmon enhancement on the catalytic properties.

This proposed research activity aims to develop novel metallic SAAs in tunnel structures of TONWs and explore their quantum plasmonic, phononic and catalytic properties by using state-of-the-art STEM related techniques.

Resumen del Currículum Vitae:

I obtained my PhD in Materials Science at Universitat Autònoma de Barcelona (UAB), Spain, in 2015, performing my research at the Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) from 2012-2015. My PhD studies involved the nanoscale characterization of plasmonic properties of hollow metal nanostructures by using monochromated Electron Energy-Loss Spectroscopy (EELS) in a scanning transmission electron microscope (STEM). We were among the first to report the distribution of plasmon fields within and around hollow nanostructures and reveal the effects of plasmon hybridization that is responsible for the enhanced properties. During my PhD I performed different international internships as visiting researcher, including the MIT (USA) for a total of 3 months and the ER-C at Forschungszentrum Jülich for 4 months. After my PhD, I went to Turkey, where I was appointed first as a Senior Research Assistant (2015-2017) and after as Assistant Professor at the Metallurgical and Materials Engineering Department of Bartın University (2017-2019). Later, I obtained an Associate Professor position in the Department of Materials Science and Engineering at Izmir Institute of Technology (IzTECH) starting in 2019 until July 2022. Between July 2022 and January 2024, as a research career break, I helped to set the Turkish office of the Mayacert SA, a Guatemala-based certification agency, as an extension of our family business. After this period, when the office was set, I decided to go back to academia to do cutting-edge TEM related research. Thus, I joined the Cardiff Catalysis Institute in the School of Chemistry of Cardiff University, UK in February 2024, to work as a Research Associate with Dr. Thomas Slater in an industry-partnered Innovate UK project. Then, in April 2025, I joined ICN2 as a Senior Researcher.

I also have gained experience for the synthesis of various semiconductor nanostructures used for catalytic applications over the last 7 years, about which I established 2 different small-scale research labs at 2 different universities. I was the Congress Chair for the 25th National Electron Microscopy Congress (EMK2021) and 1st International Microscopy and Spectroscopy Congress (MSC2021), jointly organized between 22-24 September 2021. I've been the Principal Investigator (PI) of 3 research projects awarded by public agencies and supervised 2 PhD students. I worked as a Deputy Head of Materials Science and Engineering Department of Izmir Institute of Technology between March 2020 and February 2022, and executive board member at the Turkish Society for Electron Microscopy (TEMD) between 2021 and 2023. I gave multiple presentations about nanoscience and nanotechnology for high school students. I taught various courses about materials science and engineering at the undergraduate and graduate levels. I was awarded the Izmir Institute of Technology 2019-2020 "Educator of the Year" Award, which is given to only 2 professors each year, based on the evaluations made by the students.

During my current post at ICN2, my research activities focus on the atomic scale structural, physical and chemical characterization of quantum materials and devices by using aberration-corrected STEM related techniques. I coordinate and lead a team of 5 researchers. See more details here: <https://gaen.cat/agenc>



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: CAMARASA GÓMEZ, MARÍA
Referencia: RYC2025-057128-I
Correo Electrónico: mcamarasag.goy@gmail.com
Título: First-principles and AI approaches to low-dimensional quantum matter
Resumen de la Memoria:

My expertise lies in electronic-structure theory and computational materials science, with emphasis on development of novel ab initio methods, many-body optical properties (excitons), artificial intelligence (AI), and quantum transport at the nanoscale. I use a broad range of ab initio methods (DFT, TDDFT, GW@BSE), Wannier-based models, first-principles transport simulations, and AI-driven optimization methods. I am also the lead developer of Aitranss, developer of the hybrid functionals branch in SIESTA, and a developer of FHI-aims. My work is highly interdisciplinary and includes collaborations with theoretical and experimental groups across Europe, the USA, Asia, and the Middle East.

I completed my PhD at the University of Regensburg supervised by F. Evers. My thesis established new methodologies for computing spin-orbit torques in molecular junctions at a finite bias, expanding the Aitranss package to include SOC and study quantum interference. My PhD achievements earned me the CRC IRTG Booster Program Award, funding an independent six-week postdoctoral extension, and I supervised a Bachelor student. Then, I was postdoctoral researcher at the Weizmann Institute of Science with L.Kronik supported by the Azrieli International Postdoctoral Fellowship (~47 k€/year), where I broadened my expertise to quasiparticle and excitonic physics in van der Waals materials through (TD)DFT and within the GW-BSE frameworks. During this period, I developed and applied the Wannier-localized optimally tuned functionals, achieving state-of-the-art accuracy for band gaps, excitons, and optical spectra in low-dimensional systems. I also mentored a Master student and a junior postdoc, and was awarded the Azrieli International Postdoctoral Fellowship, one of Israel's most competitive fellowships.

Currently, as independent Gipuzkoa Fellow and PI at MPC, I lead the OPTIMIA (PID2023-147324NA-I00) and the IKUR AI-SNOM projects, as well as additional computational grants at MareNostrum (227.4k€, > 15 million CPU/h). I have 20 papers (+4 under review), many in top tier journals, being first author on 8, 8 papers without my supervisors and I have been corresponding author in 5. I have presented my work at 21 conferences (1 invited; selected talks at Psi-k 2022 & IPS 2023) and at 8 invited seminars. I am also involved in launching a startup focused on AI-driven computational methods.

In the coming years, my objective to develop a new generation of machine-learning (ML)-enhanced exchange-correlation functionals to accurately and efficiently predict electronic and excitonic properties across molecules and solids. This addresses current limitations by integrating ML models with physically constrained electronic-structure frameworks. First, we will build transferable ML- functionals suitable for both molecular and condensed-matter systems. Next, we will create ML surrogate models and hybrid kernels to capture nonlinear excitations, trions, and multi-particle states beyond GW@BSE at reduced cost. Finally, all these advances will be merged into the transport package Aitranss, enabling transport simulations that explicitly include many-body excitations and plexcitonic effects. The outcome is a unified computational framework linking DFT, TDDFT, GW@BSE, ML, and quantum transport, enabling predictive modelling of complex quantum materials and molecular devices.

Resumen del Currículum Vitae:

I am an independent Gipuzkoa fellow at the Materials Physics Center (MPC). My expertise spans the theory of quantum materials based on condensed matter, materials physics, and quantum chemistry, including quantum transport, magnetism, and optical properties of low-dimensional systems. I use first-principles computational physics methods - including (time-dependent) DFT, GW@BSE - across various ab initio codes, and integrate AI techniques to enhance the efficiency of electronic-structure libraries and calculations. I am principal investigator of PID2024-159869NA-I00 from the Spanish MICIU, co-PI of IKUR HPC&AI AI-SNOM project and PI of the computational grants (FI-2025-3-0042, FI-2025-2-0052, FI-2025-1-0034, FI-2024-3-0026). I did my PhD with F. Evers at the University of Regensburg (UR), earning the SFB1277 Booster postdoc fellowship (~4 k€) for outstanding doctoral researchers. My work focused on molecular electronics and quantum transport, including self-consistent spin-orbit torques in out-of-equilibrium single-molecule junctions and quantum-interference effects using ab initio tools. After my PhD, I was a postdoc for ~3.5 years at the Weizmann Institute of Science with L. Kronik, where I won the Azrieli International Postdoctoral Fellowship (~47 k€/year). I developed screened range-separated hybrid functionals for (TD)-DFT to capture excitonic properties of low-dimensional systems. I then held a short postdoctoral position at EHU before becoming a Gipuzkoa Fellow at MPC, where I develop AI-driven optimization and surrogate models within ab initio codes, aimed at improving optical calculations in semiconducting hetero- & hybrid structures.

I have 20 papers (+4 under review: Nat. Chem. (1st-joint author), Phys. Rev. Lett., (2nd author) and an IOP FHI-aims roadmap section as first author), many in top-tier journals, as Nat. Commun., 2 npj Comput. Mater., JACS, 3 Nano Lett., Angew. Chem., Chem. Sci., or J. Phys. Chem. Lett. I am first author on 8 papers, second author on 6, corresponding author on 5, and 8 are without my supervisors, demonstrating my research independence. I have presented my work at 21 conferences (1 invited; selected talks at Psi-k 2022 & IPS 2023) and at 8 invited seminars. I am PI of 4 projects: 1 PID (PID2024-159869NA-I00), 1 IKUR HPC&AI project (co-PI), and PI of the Gipuzkoa Fellow grants (2024-FELL-000007-01, 2025-FELL-000009-01) totalling 227.4k€ (+35k€ for the 3rd year of the Gipuzkoa program). I have secured over 15 million CPU/h on MareNostrum. I am a developer of FHI aims and SIESTA, lead developer of the quantum-transport code Aitranss, and I am currently launching a startup focused on AI-driven computational methods. I have officially co-supervised 3 Bachelor (UPM, 2 ongoing), 3 Master thesis (UPM, EHU, 1 ongoing), and I co-supervise and employ 1 PhD student (DIPC@EHU). I have served on two PhD committees, one as an external expert. I have taught Physics and Computer Science courses at Bachelor and Master levels in Spain and Germany (240 hours). I co-organized a "Symposium on Molecular Electronics" at UR and an international conference in Donostia in May 2025. I actively participate in outreach (Week of Science 2024, WIS escape room, workshops for students during the International Year of Light). I also referee for high-impact journals like Nat. Commun., Phys. Rev. B, or Comput. Phys. Commun.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: QI, YAPING
Referencia: RYC2025-057287-I
Correo Electrónico: german.camacho.medina@gmail.com
Título: Programa de Investigación Interdisciplinaria que Integra IA, Espectroscopia y Materiales Cuánticos
Resumen de la Memoria:

La doctora Yaping Qi posee una trayectoria investigadora internacional estratégica y diversa, habiendo obtenido su título de Doctora en Física (PhD) en 2019 en la Universidad de Hong Kong (HKU), especializándose en heteroestructuras de óxidos funcionales. Su carrera profesional posterior no ha consistido en simples puestos secuenciales, sino en una ruta diseñada para desarrollar un conjunto de habilidades convergentes en síntesis de materiales, microfluídica, espectroscopia Raman, materiales cuánticos y bidimensionales (2D), y modelado impulsado por Inteligencia Artificial (IA).

Ha ocupado puestos en instituciones de prestigio mundial, incluyendo becas de investigación en la Universidad de Harvard (SEAS) (2017-2018), cargos como asociada de investigación en el Instituto de Ciencia e Ingeniería Cuántica de Purdue (PQSEI) (2019-2021) y visitas a Aarhus University (Dinamarca) y The University of British Columbia (UBC). Actualmente, es Profesora Asistente en el Advanced Institute for Materials Research (AIMR) de la Universidad de Tohoku, Japón, donde lidera investigación independiente, supervisa estudiantes y ha asegurado financiación competitiva internacional desde 2023.

Su independencia científica está demostrada por haber obtenido múltiples proyectos competitivos como Investigadora Principal (PI) en Japón (AIMR Fusion Grants) y Macao (Macao FDCT Innovation Grant), produciendo 16 publicaciones bajo su liderazgo. Ha publicado más de 44 artículos revisados por pares en revistas de alto impacto como Nature Communications (Q1, IF 15.7), Advanced Materials (Q1, IF 26.8) y Physical Review Letters (Q1, IF 9.0), acumulando más de 1500 citas y un índice h de 18 (Google Scholar). Ha recibido múltiples distinciones de Wiley y ha ofrecido 18 charlas internacionales, incluidas ponencias invitadas y plenarias.

Línea de Investigación a Desarrollar

La doctora Qi propone establecer un Programa de Investigación Interdisciplinaria que Integra IA, Espectroscopia y Materiales Cuánticos en la Universidad de Vigo, con un enfoque estratégico en acelerar el descubrimiento autónomo de materiales 2D energéticamente eficientes. Su visión es construir una plataforma de IA trans-escala para conectar la estructura atómica, las huellas espectrales y las propiedades funcionales macroscópicas, pasando del método de prueba y error a la autonomía de circuito cerrado

Los ejes fundamentales de su programa son:

1. Espectroscopia Impulsada por IA (AI-Powered Spectroscopy): Desarrollo de herramientas de código abierto para el análisis espectral (Raman, fotoluminiscencia, etc.) que utilizan modelos de aprendizaje profundo (Deep Learning) y modelos generativos basados en difusión para la clasificación y reducción de ruido en datos espectrales multimodales, facilitando la caracterización de materiales cuánticos.
2. Descubrimiento Guiado por Datos de Ferroeléctricos 2D: Construcción de una base de datos de ferroeléctricos 2D y modelos de IA para el cribado rápido de materiales con propiedades deseables, como la ferroelectricidad a temperatura ambiente en nanocables de Telurio elemental, un descubrimiento que co-lideró (publicado en Nature Communications, 2024).
3. Bases de Datos de Superconductores y Cribado por IA: Compilación de una base de datos de Superconductores de Alta Temperatura (HTS) y desarrollo de modelos de aprendizaje para sugerir candidatos no convencionales de HTS

Resumen del Currículum Vitae:

La doctora Yaping Qi es una investigadora con una trayectoria internacional estratégica, especializada en el descubrimiento autónomo de materiales. Obtuvo su Doctorado en Física en la Universidad de Hong Kong (HKU) en 2019, centrado en heteroestructuras de óxidos funcionales. Desde entonces, ha construido un perfil multidisciplinar que combina síntesis de materiales, microfluídica, espectroscopia Raman, materiales 2D y cuánticos, y modelado asistido por Inteligencia Artificial (IA).

Actualmente es Profesora Asistente en el Advanced Institute for Materials Research (AIMR) de la Universidad de Tohoku, Japón, donde lidera investigación independiente y obtiene financiación competitiva internacional. Su experiencia previa incluye posiciones clave en Estados Unidos y Canadá: fue Research Associate en el Purdue Quantum Science and Engineering Institute (PQSEI) y Research Fellow en la Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS), donde desarrolló plataformas microfluídicas. También realizó una estancia postdoctoral visitante en la Universidad de British Columbia (UBC). En Europa ha estrechado vínculos mediante estancias en la Universidad de Aarhus y la Universidad de Vigo, colaborando en espectroscopia asistida por IA.

La Dra. Qi ha publicado más de 44 artículos revisados por pares en revistas de alto impacto como Nature Communications, Advanced Materials y Physical Review Letters, acumulando más de 1500 citas y alcanzando un índice h de 18. Entre 2023 y 2025 ha recibido reconocimientos de Wiley como Top Cited Article, Top 10 Most-Cited Paper y Top Downloaded Article. Además, ha impartido 18 charlas internacionales, incluidas ponencias plenarias e invitadas.

Ha consolidado su independencia científica obteniendo financiación como Investigadora Principal (PI) en Japón (tres AIMR Fusion Research Grants y TUMUG DEI Fund) y en China (Macao FDCT Innovation Grant). Estos proyectos han generado 16 publicaciones bajo su liderazgo, con nueve como primera, co-primeras o autoras de correspondencia. También ha desempeñado un rol activo en la comunidad científica editando números especiales,



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

revisando manuscritos para revistas de primer nivel como Nature Computational Science, JACS y PNAS, y mentorando a más de 20 investigadores jóvenes en seis países.

Entre sus contribuciones científicas más destacadas se encuentran: la primera evidencia experimental de ferroelectricidad a temperatura ambiente en nanocables de telurio monoelementales; el desarrollo de una plataforma Raman asistida por Deep Learning para identificar materiales 2D utilizando modelos generativos; estudios avanzados en ingeniería de deformación en materiales 2D; y una colaboración con la Universidad de Vigo que resultó en una publicación aplicada a diagnósticos clínicos mediante espectroscopia asistida por IA.

La Dra. Qi se encuentra estratégicamente posicionada para transferir su experiencia en IA, espectroscopia y materiales cuánticos al ecosistema de I+D español.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales

Nombre: TIWARI, NAVEEN

Referencia: RYC2025-054933-I

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Título: Materials for soft electronics

Resumen de la Memoria:

As a highly experienced researcher in chemistry, materials science and engineering, I possess a deep understanding of both fundamental theories and their translation into real-world applications for advanced materials. These include the development of smart materials such as self-healable polymers and composites for flexible and transparent electronic devices, dielectric elastomers tailored for haptic interfaces and soft robotics, and nanomaterials engineered for biomedical applications. Currently, I am serving as a SUSBIO Postdoctoral Fellow with in the Faculty of Medicine and Health Technology at the Tampere University, Finland. Previously, I was a Marie-Curie Postdoctoral Fellow at the University of Santiago de Compostela, Spain. My work here involves the development of Self-healing materials for soft robots. I also worked as a Postdoctoral Research Fellow at the Pennsylvania State University, USA and the National Tsing Hua University, Taiwan includes working on projects such as magnetic material-based soft robots for biomedical applications and non-invasive wearable biosensors for real-time monitoring applications. I also worked on a wearable and flexible chemical sensor (TENS) combined with a robotic hand to identify hazardous chemical analytes. I have also established myself as one of the emerging research leaders in the area of "Materials Science and Technology" evidenced by multiple (31) publications in reputed journals with total citations >2100 and h-index of 23 (Google Scholar)

My research track record demonstrates not only my ability to deliver high-quality research outcomes but also my capacity to manage other responsibilities, such as student supervision, laboratory management, and planning of visits. With a deep passion for the discipline of Polymer Science and Engineering, I am eager to continue exploring new frontiers in the field and making meaningful contributions to the advancement of soft materials and their applications.

Line of Research: Presently, I am experienced and interested in enhancing the wearable sensor for continuous monitoring of health markers. So, I propose a "Microneedles based Wearable Sensor platform for continuous monitoring of health markers from Interstitial Fluid (MIF-Sense)". Wearable electronics are devices which can be worn or integrated within human skin for the continuous and real-time monitoring of an individual's physiological state without interruption of the user's daily activities. Interstitial fluid (ISF), as a biofluid with a composition closely resembling that of blood, has emerged as a promising source of clinically significant biomarkers and analytes that can be used in the development of wearable sensors that enable non-invasive, real-time monitoring of key health biomarkers. MIF-Sense will take self-healing materials into a new context by intertwining materials chemistry and bioelectronics. Specifically, MIF-Sense aims to develop an integrated platform that employs microneedle arrays engineered to penetrate the stratum corneum and epidermis with minimal discomfort, thereby allowing for continuous data collection in a skin-conformal, comfortable format that seamlessly integrates into everyday life. However, to the best of my knowledge, MIF-Sense will be the first self-healing microneedle platform based on ISF, integrating a self-powered sensor system for continuous monitoring.

Resumen del Currículum Vitae:

Currently, I am a SUSBIO Postdoctoral Research Fellow at the Faculty of Medicine and Health Technology, Tampere University, Finland (Independent Researcher), which is funded by Research Council of Finland. Recently, I completed my Marie Curie Fellowship (Independent Researcher) at CiQUS, University of Santiago de Compostela, Spain. Previously, I was a Postdoctoral Research Fellow at Penn State University, USA and National Tsing Hua University, Taiwan. I did my PhD from NTU Singapore and Masters (M.Tech) from IIT Kanpur in Materials Science and Engineering. I also did my B.Sc. and M.Sc. from Ramakrishna mission Vidyamandira in Industrial Chemistry and Applied Chemistry, respectively.

My research covers topics in the synthesis of smart materials like self-healing materials for soft electronics, printed electronics, triboelectric nanogenerators and nanosensors, nanomaterials for biomedical applications and dielectric elastomers for the applications of haptic devices and soft robots. I have established myself as one of the emerging research leaders in "Materials for Soft Electronics" evidenced by multiple publications in reputed peer-reviewed journals as an author as well as corresponding author, which is the perfect mix for undertaking this (MIF-Sense: RyC 2025) interdisciplinary project. I have presented my work at numerous international conferences and received the Best Oral Presentation Award at the E-MRS Fall Meeting and Exhibit at the Warsaw University of Technology, Poland, in 2018. Additionally, I have served as a Guest Editor for the MDPI Polymers and Discover Robotics (Springer Nature) and was selected as a Junior Fellow in the Sustainable Robotics cohort by the Brussels Institute for Advanced Studies (BriAS) in 2024. Importantly, I was ranked 30 (Material Science & Technology) in the RyC 2024 call.

I have collaborated with leading research groups in diverse fields, including chemistry, electrical engineering, biomedical engineering, and engineering science, across institutions such as NTU Singapore, NTHU Taiwan, Penn State USA, Tecnológico de Monterrey, Mexico & Tampere University, Finland. My interdisciplinary collaborations include material synthesis with chemists, machine learning with computer scientists, and spectroscopic studies with physicists. I have also successfully secured funding for several projects, including ~450,000 NTD for three years at NTHU Taiwan to develop wearable sensors for biomedical application and ~182,000 through the MSCA-PF for research on electroactive polymeric materials for soft robots. I was awarded the CiQUS SYNERGY 2024 Grant (~20,000) for a project on self-healable polymers for flexible electronics and selected for the National Overseas High-Level Talent Recruitment Plan in Jiaxing City, Zhejiang Province, China (2025-2028). Currently, I have been funded by Research Council of Finland for 3 years for my SUSBIO project (~180,000).

With over a decade of experience in researching and developing innovative electronic materials and devices, and a strong publication record, which make me a strong candidate for this opening (RyC2025).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: HAMAD , HESHAM ALI FAHMY ABDALLA
Referencia: RYC2025-057245-I
Correo Electrónico: heshamaterials@hotmail.com
Título: Researcher in Nano-technology

Resumen de la Memoria:

Career Path
09-2025- Now Researcher / Tohoku University /Japan
10/2023-09/2025 Researcher / University of Granada (UGR)/ Spain/Contract completed
10/2022-10/2023 Post-Doc. Researcher / University of Paris City / France / Fellowship completed
09/2020-09/2022 Scientist/ University of Warsaw / Poland/ Fellowship completed
04/2019-09/2020 Assistant Professor/ City of Scientific Research and Technological Applications (SRTA-City)/ Egypt/ Promotion to Associate Professor
01/2019-04/2019 Post-Doc. Researcher/ Elettra Sincrotrone Trieste/ Italy / Fellowship completed
03/2018-11/2018 Researcher, University of Padova / Italy / Fellowship completed
09/2014-11/2018 Pre-doctoral Researcher, University of Granada (UGR)/ Spain/ Ph.D granted
04/2013-09/2014 Assistant Researcher/ City of Scientific Research and Technological Applications (SRTA-City) / Egypt / Erasmus-Mundus Fellowship for Ph.D
04/2010-04/2013 Researcher Assistant/ City of Scientific Research and Technological Applications (SRTA-City) / Egypt / Promotion to Assistant Researcher

The main research line: ☐Design of multifunctional catalysts for environmental and energetic applications: Towards real efficient activity for sustainable fuel production☐

Resumen del Currículum Vitae:

During the last sixteen years, the applicant has demonstrated the ability to conduct high-quality multidisciplinary research at the interface of several fields, gaining a comprehensive background in catalysis for energy and environmental chemistry by hybrid materials. He has been ranked among the Top 2% Scientists Worldwide by Stanford University for five consecutive years (2020-2025), underscoring his global visibility and research impact.

1. Scientific Contributions: The scientific outputs include: (i) Publications: 2 books, 1 book chapter, and 71 research articles with a cumulative impact factor of 391.4 and 52 journals, resulting in an h-index of 37 and total citations of 4761 (Google Scholar). Notably, 84% of his publications appear in the top 25% (Q1) journals and 49 % in top 10 % (D1); (ii) Authorship and Collaboration: 87% of his publications list him as a corresponding author, 77% as a first or last author, and he has collaborated with 191 researchers from internationally recognized institutions across Spain, Egypt, Italy, France, the UK, Japan, and Poland; (iii) Conferences and Communication: He has delivered 31 oral, poster, and invited talks at international conferences, showcasing his independent scientific results and exceptional writing skills; (iv) Funding Acquisition and Project Leadership: He has contributed to over 19 research projects and fellowships, including 7 Egyptian, 5 Spanish, 2 Polish, 2 Italian, and one Pakistani, demonstrating strong grant acquisition, project writing, and management capabilities; (v) Research Experience: He has designed and executed his own research projects, serving as the primary intellectual and experimental driving force during his tenure in Spain, Italy, France, the UK, Japan, Poland, and Egypt; (vi) Editorial Responsibilities: He is an Associate Editor of Advanced Carbon Journal and has acted as a Guest Editor for Journal of Adsorption Science and Technology; (vii) Peer Review Contributions: He has reviewed 120 manuscripts for high-impact journals, reinforcing his commitment to scientific integrity and progress; and (viii) International Mobility: He has undertaken research stays at the University of Padova and Elettra Sincrotrone Trieste (Italy, 2018-2019), SRTA-City (Egypt, 2019-2020), the University of Warsaw (Poland, 2020-2022), and the University of Paris City (France, 2022-2023), University of Granada (Spain, 2023-2025). Currently, he is an associate researcher at the University of Tohoku, Japan.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: CEREZO BASTIDA, JAVIER
Referencia: RYC2025-057047-I
Correo Electrónico: jcb1@um.es
Título: Advanced computational tools to model photoactive materials

Resumen de la Memoria:

He desarrollado mi trayectoria en Química Teórica y Computacional, con un enfoque continuo en la modelización de procesos fotofísicos y la simulación multiescala de sistemas moleculares complejos. Tras doctorarme en la Universidad de Murcia en 2013 (Premio Extraordinario), trabajé en la modelización de sistemas biológicos mediante estrategias híbridas QM/MM aplicadas a cromóforos y nucleobases.

Mi formación postdoctoral se llevó a cabo en ICCOM-CNR (Pisa, Italia, 2.7 años), financiada por la Fundación Ramón Areces y el Ministerio Italiano de Investigación, bajo la supervisión del Dr. Fabrizio Santoro. En este periodo desarrollé metodologías para la simulación vibro#769;nica y el tratamiento de coordenadas internas en espectroscopía, que más tarde darían lugar al software FCclasses3. También realicé una estancia financiada en Virginia Tech (EE. UU.), donde desarrollé complementos para Psi4 que posteriormente integré en mis propios códigos. Esta etapa consolidó una red internacional de colaboraciones activas (Italia, Francia, España).

Tras mi regreso a España (programa Saavedra-Fajardo, UMU), inicié una línea de investigación independiente en simulación de procesos fotoinducidos, ampliada posteriormente durante mi etapa en la UAM como Profesor Ayudante Doctor y Profesor Permanente. A partir de 2020, reforcé mi actividad en el desarrollo de campos de fuerza derivados de mecánica cuántica (QMD-FF), lo que culminó en JOYCE3.0, un software colectivo liderado científicamente por el Dr. G. Prampolini y por mí. Estos desarrollos han permitido extender estrategias mixtas cuántico-clásicas al estudio de materiales orgánicos fotoactivos y entornos complejos. Actualmente me he reincorporado a la UMU, donde mantengo mi red de colaboradores y continúo desarrollando mis principales líneas de investigación.

Mi producción científica incluye más de 60 artículos (>70 % Q1, h = 24), con un número creciente de publicaciones como autor de correspondencia (cinco en los dos últimos años), destacando aportaciones en modelización vibro#769;nica, campos de fuerza cuánticamente derivados y simulaciones multiescala aplicadas a materiales con funcionalidad óptica. Mi software FCclasses3 recibió en 2022 el premio anual de la División de Química Computacional de la RSEQ por desarrollos metodológicos. He impartido más de 25 contribuciones en congresos, incluyendo ponencias invitadas, y realizo una actividad regular como revisor en revistas de alto impacto.

Actualmente soy co-Investigador Principal del proyecto nacional PID2023-151719NA-I00, centrado en el diseño computacional de materiales fotoactivos basados en arquitecturas de ADN. Este proyecto apoya un equipo en crecimiento, incluyendo un doctorando bajo mi supervisión. Mantengo colaboraciones activas con grupos en ICCOM-CNR, KU Leuven, Université de Nantes, IMDEA, IIT-Hyderabad y Université de Nancy.

La línea de investigación que propongo para esta convocatoria se basa en el desarrollo de campos de fuerza avanzados y técnicas multiescala para la simulación predictiva de fotofísica en materiales moleculares. Integrando mis contribuciones en QMD-FF, simulación vibro#769;nica y estrategias MQC, el objetivo es establecer protocolos robustos que permitan comprender y diseñar materiales fotoactivos con funcionalidades ópticas relevantes para fotónica molecular, sensores, tecnologías energéticas y bio-optoelectrónica.

Resumen del Currículum Vitae:

1. Perfil
Profesor Permanente Laboral (Contratado Doctor) en la Univ. Autónoma de Madrid hasta 2025; reincorporado a la Univ. de Murcia en 2025. Acreditado a Profesor Titular con certificado I3.

Doctor en Química (UMU, 2013, Premio Extraordinario). FPU predoctoral.

MSc European Master in Theoretical Chemistry (2011, UMU, 9.77/10).

MSc en Química Avanzada (UMU, 2010, 9.92/10).

Licenciado en Química (UMU, 2007, Premio Fin de Carrera).

2. Líneas de investigación

Fotofísica computacional y espectroscopía electrónica: más de 35 artículos en el área. Coautor y codesarrollador de FCclasses3, código ampliamente adoptado para simulaciones vibro#769;nicas y procesos no radiativos (≈1000 descargas, >110 citas). Premio GEQC-RSEQ 2022 por desarrollos metodológicos.

Modelización multiescala y campos de fuerza QMD-FF: simulación de sistemas fotoactivos mediante estrategias mixtas QM/MM y MQC. Codesarrollador de JOYCE3.0, protocolo general para parametrización de FF intramoleculares desde datos cuánticos (9 citas en 2024-2025).

Diseño computacional de materiales moleculares fotoactivos: cromóforos orgánicos, agregados supramoleculares, matrices ordenadas y arquitecturas basadas en ADN.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

3. Publicaciones

>60 artículos (≈70 % Q1) desde 2011: 1 JACS, 2 JPCL, 8 PCCP, 10 JCTC, 4 JCP.

Autor de correspondencia en 12 artículos, 5 en los últimos dos años (incluidos trabajos metodológicos clave).

Métricas: >1200 citas, h-index = 24 (Scopus).

Esta trayectoria refleja liderazgo creciente

4. Revisor y participación en comités científicos

Revisor habitual para JACS, JPCL, PCCP, JCTC, JCP y Acc. Chem. Res., con ~9 revisiones/año en los últimos cinco años.

Revisor de un proyecto ANR (Francia)

Miembro de la junta de la CπC Society.

Participación en 5 tribunales de tesis doctorales.

5. Códigos computacionales

FCclasses3: simulación vibrónica basada en coordenadas internas y modelos verticales avanzados.

JOYCE3.0: parametrización reproducible de FF intramoleculares para materiales funcionales.

Complementos desarrollados para Psi4 integrados en mi flujo de trabajo.

6. Estancias investigación

Predotorales

National University of Ireland (Prof. Eriksson, 2011, 3 meses).

ICCOM-CNR (Santoro, 2013, 3 meses).

Postdoctorales

ICCOM-CNR (Santoro, 2013-2016, 2.7 años).

Virginia Tech (Crawford, 2015, 2 meses).

ICCOM-CNR (2022-2023, 12 meses).

7. Internacionalización

Participación en >25 congresos (2 invitadas, 16 orales). Seminarios invitados en KU Leuven (2022, 2023), Université de Nantes (2022) y UMA. Organización de la conferencia internacional CπC13 (Madrid, 2023) y participación en cuatro CECAM Flagship Schools.

Estancias acogidas: doctorandos de Málaga (2022), KU Leuven (2022) y Université de Nancy (2023). Colaboraciones activas con ICCOM-CNR, KU Leuven, UNantes, IMDEA, IIT-Hyderabad y Nancy.

8. Docencia y tutorización estudiantes

Docencia en grado y máster en UMU y UAM.

Supervisión: 7 TFG, 3 TFM (uno de ellos como supervisor único), co-supervisión de un doctorando actualmente en curso. Mentoría adicional de estudiantes visitantes (2 PhD, 1 MSc).

9. Proyectos

Co-IP del proyecto nacional PID2023-151719NA-I00 (diseño computacional de materiales fotoactivos basados en ADN).

Participación en proyectos regionales y nacionales en UMU y UAM, y programas de movilidad competitivo



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: GE, JINGUO
Referencia: RYC2025-054431-I
Correo Electrónico: 09gejinguo@sina.cn
Título: Heterogeneous Microstructure Engineering in Metal Additive Manufacturing

Resumen de la Memoria:

My research trajectory focuses on metal additive manufacturing (MAM), with emphasis on LPBF process-microstructure-property relationships, anisotropy, and heterogeneous microstructure engineering. Across multi-institutional settings and funding systems, I have developed mechanistic frameworks that connect processing-driven thermal histories to grain refinement, defect evolution, and mechanical/functional performance in alloys relevant to structural, biomedical, and high-temperature applications. My output demonstrates sustained productivity and translation-oriented innovation, including 16 competitively funded projects (total funding > RMB 4 million, PI), 24 first/corresponding-author SCI papers, and 15 patents, evidencing the capacity to define and execute original research lines with both scientific and applied impact.

For the RyC stage, my line of research establishes an original programme on microstructure engineering in heterogeneous microstructural metals (HMS-metals) produced by LPBF, focusing on CoCrNi medium-entropy alloys (MEAs) with periodic coarse-fine grain architectures to overcome the intrinsic strength-ductility trade-off in conventional alloys. The scientific and technological goals are threefold: (i) develop a layer-wise in-situ alloying strategy (e.g., nano-Mo additions) to fabricate HMS-metals with periodically modulated grain architectures; (ii) build an integrated mechanistic framework linking LPBF parameters to grain refinement, GND accumulation, HDI hardening, and temperature-dependent deformation; and (iii) implement a machine-learning-assisted predictive model to forecast anisotropic tensile properties as a function of loading direction and testing temperature, enabling accelerated design and optimisation. This research addresses key gaps, including the lack of experimental studies on periodic coarse-fine structures, limited knowledge of temperature-dependent anisotropic mechanisms, and insufficient predictive tools linking heterogeneity to macroscopic performance. Technologically, it enables scalable routes to high-strength, high-ductility, damage-tolerant LPBF components for cryogenic aerospace, electronics, and nuclear applications, while supporting data-driven AM workflows aligned with Industry 4.0 priorities.

IMDEA Materials Institute is the applicant's preferred host due to its world-class LPBF and advanced characterisation infrastructure, leading expertise in heterogeneous microstructures, and strategic alignment with Spain's priorities in advanced metallurgy. Embedding the project within Prof. Teresa Pérez-Prado's Sustainable Metallurgy group ensures unmatched synergy, accelerated scientific maturation, and strong long-term institutional impact. The successful implementation of this RYC project will strengthen Spain's leadership in MAM and significantly enhance IMDEA's international scientific impact, directly advancing EU strategic frameworks- including the Made in Europe Partnership, the EU Circular Economy Action Plan, and the New European Industrial Strategy- that prioritise sustainable, high-performance metallic materials and sovereign manufacturing capacity.

Resumen del Currículum Vitae:

I am an EU-funded MSCA Postdoctoral Research Fellow at Trinity College Dublin (TCD) and a researcher in metal additive manufacturing, specialising in LPBF metallurgy, microstructure tailoring, and structure-property relationships. My work spans functional and structural metallic systems (including MEAs and biomedical/engineering alloys) and integrates advanced processing with multi-scale characterisation to deliver actionable understanding of how processing routes define performance. I have led or independently acquired 16 competitive research projects (total funding > RMB 4 million), including an internationally prestigious Horizon Europe MSCA Fellowship (€268,000, PI), demonstrating competitiveness in securing and managing high-standard funding.

My track record comprises 71 peer-reviewed journal publications, including 47 SCI-indexed papers and 24 papers in leading Chinese core journals, alongside 15 China patent applications. All 18 first-author and 6 corresponding-author publications are SCI-indexed. My work has accumulated >1,300 citations on Google Scholar with an h-index of 20, reflecting strong international visibility in metal additive manufacturing. I have delivered presentations at 8 academic conferences and supervised 39 students (21 graduates: 12 undergraduate, 9 master's; and 18 ongoing: 9 undergraduate, 6 master's, 3 PhD candidates), evidencing sustained training capacity.

My current and proposed research advances toward the intentional design and mechanistic exploitation of periodic heterogeneous microstructures in LPBF metals, integrating layer-wise alloying, temperature-dependent deformation mechanisms, and ML-based predictive modelling to enable accelerated materials design. This direction targets high-impact gaps in AM science and aligns directly with EU and Spain's priorities in advanced manufacturing, high-performance structural materials, and data-driven metallurgy.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: KUMAR , KRISHAN
Referencia: RYC2025-056655-I
Correo Electrónico: ks90859@gmail.com
Título: AI-Guided CRISPR nanogels for treatment of cystic fibrosis

Resumen de la Memoria:

Dr. Krishan Kumar's research trajectory lies at the intersection of polymer chemistry, nanobiotechnology, and advanced therapeutic technologies. Since completing his PhD at the University of Delhi (2021), where he investigated polymer-protein interactions and self-assembly phenomena, he has progressively evolved toward highly interdisciplinary research with a strong biomedical focus. During his postdoctoral period in South Korea (2022), he initiated his first independent research lines on nanozymes and single-atom catalysts, establishing his ability to lead competitive projects as Principal Investigator. Since 2023, Dr. Kumar is working at POLYMAT-UPV/EHU, supported by prestigious fellowships, developing enzyme nanogels for delivery of different proteins by employing a stimuli responsive crosslinker during polymerization. These nanogels are engineered to encapsulate and protect biomacromolecules, enable controlled release, and facilitate targeted cellular uptake. During the execution of the RYC funding I aim to expand my expertise in polymeric formulations for the treatment of genetic diseases by delivering gene editing component (CRISPR-Cas9), a field with substantial translational and commercial potential.

Resumen del Currículum Vitae:

Krishan Kumar received his bachelor's degree in June 2015 in Chemistry from Ramjas College, University of Delhi, India. In 2017, he completed M.Sc. degree with a specialization in Physical Chemistry from the Department of Chemistry, University of Delhi, India. In October 2021, he completed his Ph.D. in Biophysical Chemistry under the supervision of Prof. Pannuru Venkatesu from the University of Delhi. He started his Postdoctoral research in January 2022 in the Department of Biological Engineering, Inha University, South Korea under the supervision of Prof. Yun Suk Huh, working at the interface of Material Science and Biology. During Ph.D. his work was focused on studying the polymer phase transitions in presence of different additives such as proteins, ionic liquids, and deep eutectic solvents. His post-doctoral research work was focused on the preparation of MXene based nano catalysts for mimicking the activity of natural enzymes. In January 2023, he joined Responsive Polymer Therapeutics Group as Juan de la Cierva fellow working under the leadership of Prof. Marcelo Calderon to develop his research in the preparation of nanogels for drug delivery applications.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales

Nombre: BOARETTO , NICOLA

Referencia: RYC2025-055538-I

Correo Electrónico: nic.boaretto@pm.me

Título: Nicola Boaretto

Resumen de la Memoria:

I am a researcher with nearly 20 years of experience in polymer electrolytes and lithium-battery technologies. My work spans the development of fuel-cell membranes, hybrid inorganic-organic polymer electrolytes, gel polymer electrolytes, solid-state battery components, and interfaces for silicon anodes. Over my career, I have authored 34 peer-reviewed publications, six patents, and I currently hold an H-index of 20.

My scientific contributions include developing composite Nafion-based membranes for fuel cells, polysiloxane hybrid electrolytes for lithium batteries, CNT-fiber current collectors for flexible batteries, and high-performance gel and single-ion conducting polymer electrolytes. More recently, I have led work enabling the operation of practical 1 Ah-class high-voltage solid-state batteries and introduced additives for SEI-engineered in silicon anodes.

I have been deeply involved in industrial collaborations with companies such as BMW, DSM, Huawei, Basquevolt, and Belenos, where I often served as principal investigator. I have also taken leadership roles in several European projects (SAFELiMOVE, SPINMATE, SOLIDBAT), coordinating work packages, writing technical deliverables, and contributing to scientific and technological transfer.

I actively participate in scientific dissemination, having presented at major international conferences.

My career has been shaped by strong international mobility, with long research stays in Italy, Germany, and Spain, collaborative work across Europe, North America, and Asia, and fluency in Italian, English, German, and Spanish. These experiences have allowed me to build a broad and enduring global network.

Over the years, I have progressively gained scientific independence, managing industrial projects, coordinating research teams, supervising students, and acquiring funding. I am currently senior researcher at CIC energiGUNE, where I have taken on roles ranging from supervising PhD projects to contributing to institutional decision-making, while leading both internal and external research initiatives.

In the future, my research will focus on electrolytes and components for lithium batteries: (i) in-situ crosslinked gel polymer electrolytes using advanced electrolyte design principles; (ii) composite and hybrid electrolytes integrating functional inorganic fillers; (iii) water-processable and functional binders for anodes and cathodes; and (iv) electrolyte additives tailored to stabilize silicon anodes and high-voltage cathodes. Through these lines, I aim to improve battery performance, safety, manufacturability, and fundamental understanding of ion transport and interfacial processes.

Resumen del Currículum Vitae:

I am a materials scientist expert in polymer electrolytes for electrochemical energy storage, including fuel cells and lithium-based batteries.

Between 2008 and 2010, I worked at the University of Padua on composite proton-exchange membranes for fuel cells. In 2012, I joined the Fraunhofer Institute for Silicate Research (Fraunhofer ISC) in Würzburg to pursue a PhD focused on the synthesis and characterization of hybrid inorganic-organic polymer electrolytes for lithium metal batteries, in collaboration with the University of Padua as grading institution. Since then, I have contributed to multiple public-funded and industrial R&D projects on lithium-ion and solid-state batteries. These include works on silicon-based anodes, advanced binders and separators, polymer and composite electrolytes, and lithium processing and passivation techniques. In 2018, I joined the IMDEA Energy Institute as a postdoctoral researcher, focusing on the development and prototyping of flexible lithium-polymer batteries, and working in close collaboration with the IMDEA Materials Institute. There, I was granted a Talent Attraction Research Grant for young postdoctoral researchers from the Community of Madrid (grant Nr. 2018-T2/AMB-12025). In 2019, I moved to CIC energiGUNE, where, as Senior Researcher, I currently lead research on binders and electrolytes for lithium battery applications.

My research area spans from the synthesis and physical-chemical characterization of hybrid and composite polymer electrolytes to device assembly and electrochemical performance testing. My research interests lie particularly in electrochemical analysis and in understanding ion and polymer and ions dynamics in soft ion-conducting materials.

During my research activity, I have led work packages in three major EU projects (SAFELiMOVE, SPINMATE, and SOLIDBAT), two of them coordinated by my institution, and participated in the proposal preparation of two of them (SPINMATE, SOLIDBAT). Beside working in public-funded projects, I have also participated in several industrial projects with the following companies (in chronological order): TEXA SpA (Italy), Breton SpA (Italy), BMW Group (Germany); DSM N.V. (Netherlands); Grupo Antolin (Spain), Huawei Tech Co Ltd. (China), Basquevolt S.A.U. (Spain), and Belenos Clean Power Holding Ltd. (Switzerland), leading at least three of these projects.

Regarding my research output, I have coauthored 34 peer-reviewed publications. In many of these publications I am listed as first, second, corresponding, or last author (13, 12, 10, and 2, respectively), which proves that I have made a major contribution to most of these publications. I am also listed as co-inventor in 6 patents and currently hold an H-index of 20 (Scopus). With regard to mentoring activities, I have supervised five TFG/TFM theses, and I am currently supervising two PhD candidates.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: MARTIN SALDAÑA, SERGIO
Referencia: RYC2025-054747-I
Correo Electrónico: smartinsaldana@gmail.com
Título: Biomaterials to tackle Extracellular Matrix Remodeling in Neuroinflammatory Driven Disorders
Resumen de la Memoria:

Since I left the centre where I developed my PhD in January 2017, I did not work with any of my supervisors or have any professional relation with them for almost 8 years (until September 2024 when I joined the Biomaterials Group at the Instituto de Ciencia y Tecnología de Polímeros, CSIC as a CIBER-BBN Researcher), proving my independence. Moreover, my track record is a written prove of my independence, having papers as corresponding author coming from all the international labs in which I have worked since 2017.

Based on my record of accomplishment and gained experience in three different countries, my research lines will implement the knowledge and techniques acquired over the last twelve years in the fields of biotechnology, biomaterials and applied biology:

There is a blossoming interest in the last two decades about the critical role of the Extracellular Matrix (ECM) in the development and homeostasis of the Central Nervous System (CNS) and its potential to develop therapeutic strategies. The upregulation of some particular ECM molecules by reactive astrocytes during neuroinflammation and neurodegeneration results in the formation of growth- non permissive environment and impaired synaptic plasticity similar to what happen in fibrotic tissues when collagen is over expressed. All this data suggests that targeting the expression of specific ECM molecules may lead to the development of new therapeutic strategies promoting regeneration and synaptic plasticity.

Herein, I will set to test the role in the onset of neuroinflammation of HA-CD44 interaction through different HA constructs. The role of HA-CD44 interaction has been studied mainly in Cancer, but my project will be the first of its kind in studying the role of this interaction and the affinity of the binding in the resolution of inflammation in the CNS. My hypothesis is that the way of presenting HA-based constructs will lead to different HA-CD44 interactions and binding affinities having a critical impact on the resolution of neuroinflammation. Thus, the downregulation in the intrinsic HA synthesis from the astrocytes will avoid the HA deposition which is detrimental in the long term after an inflammatory insult.

My ultimate research goal is to understand the molecular basis of neuroinflammation which would allow to develop treatments to improve the outcome of its related pathologies.

Resumen del Currículum Vitae:

My career has always been at the frontier of Biology and Materials Science. I began my research journey working on potential otoprotectors against cisplatin (CDDP)-induced ototoxicity. As a result, I received the Outstanding Doctorate Award by Universidad Autónoma de Madrid, 2018 and the Best PhD Thesis in the Research Excellence Awards 2017 by IDIPHIM, 2018, and led to a transfer of technology research project (CIBER-BBN Transfer Programme: Nanodeafness project -120,000€).

Afterwards, I worked as a researcher in the Research and Development Department of Gihon Laboratorios Químicos SRL, a pharmaceutical company in Argentina, during two time periods (03/2017-07/2018 and 09/2021-02/2022). My main role was to lead a project dealing with the synthesis of waste sourced-chitosan to develop particulated systems to act against ubiquitous crop pathogens. As a result, a patent was presented and the start-up UNIBAIO was created to scale-up the processes and transition to a more sustainable agriculture.

I continued my post doctorate experience as a Marie Skłodowska Curie Individual Fellow (MSCA-IF Project number: 797716) hosted by Prof. Abhay Pandit at CURAM, University of Galway, with the project "Development of a Functionalized Biomaterial Scaffold to Treat Multiple Sclerosis". Furthermore, I led a side-project focused on the development of drug delivery systems to tackle ischemic stroke resulting in the 2025 Molecular Pharmaceutics Early Career Best Paper Award for the Europe/Middle East/Africa region.

I worked as a Postdoctoral Researcher at POLYMAT, focused on synthesizing nanogels and macrogels with therapeutic potential in inflammatory and degenerative processes. I set-up from scratch the Cell Culture facilities of the group led by Prof Marcelo Calderon hired under the IKUR Neuroscience Actions of the Basque Government.

I am currently working as a Researcher of CIBER-BBN at the ICTP-CSIC, where I led the research lines involving the biological assessment of new potential therapeutics aiming to tackle inflammatory driven. I have recently secured as a Principal Investigator a MaX-CSIC Seed Interareas collaboration project funded with 4,500 €, and a MaX CSIC Posdoctoral Project funded with 10,000 €.

Furthermore, I am currently directing PhD candidate Irene Bravo Blanco after officially directing her MSc from the UC3M (qualified with 10).

I am part of the Board of the recently created Sociedad Española de Medicina Regenerativa e Ingeniería de Tejidos (SEMIT) where we intend to promote research and innovation in the fields of regenerative medicine and tissue engineering in Spain. We did organize SEMIT 2025, held in Barcelona. Moreover, during 2024 and 2025 I chaired three sessions on the Grupo Especializado de Polímeros (GEP2024), where I also participated as staff of the organization, and the 8th and 9th Young Polymer Scientist Seminar.

Overall, the results of my research have led to 35 scientific publications, 5 of them as corresponding author coming from different international labs proving my independency, in top field scientific journals. Due to my solid international experience, I established a collaborative network, including researchers from Argentina (Dr Vera A. Alvarez, INTEMA; Dr Cecilia Terrile, UNMLP), China (Prof Yazhong Bu; Xi'an Jiaotong University) and Ireland (Prof Abhay Pandit, CURAM).



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: TORRES MENDIETA, RAFAEL OMAR
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Correo Electrónico: rafael.omar.torres.mendieta@gmail.com
Título: Shaping Matter with Light: Innovation in Laser Nanotechnology

Resumen de la Memoria:

My scientific trajectory has been driven by a longstanding fascination with how light manipulates matter at the nanoscale, enabling materials with unique optical and catalytic functionalities. I have produced 47 high-impact publications (12 as first author, 15 as corresponding author), an h-index of 19, and over 1087 citations (Scopus, 12/2025). Most articles appear in Q1 journals such as Carbohydr. Polym., Water Res., J. Clean. Prod., Green Chem., and Sep. Purif. Technol. I also review for leading journals including Chem. Eng. J., ACS Appl. Mater. Interfaces, and J. Hazard. Mater., and contribute to competitive grant evaluations.

I am regularly invited to present at top-tier international conferences, including the International Conference on Catalysis and Reaction Engineering (CRE) 2025 edition, International Conference on Advanced Nanoparticle Generation and Excitation by Lasers in Liquids ANGEL, editions 2023 and the upcoming 2026, Annual World Congress of Nano Science & Technology (Nano S&T-2023), 2023 edition, Global Summit on Advanced Materials and Sustainable Energy (GSEMSN) 2022 edition, and International Conference on Nanomaterials, Nanofabrication and Nanocharacterization (NANOMACH) 2021 edition. I have taught and mentored at the Federal University of São Carlos (Brazil, 2020), Rajamangala University of Technology Thanyaburi (Thailand, 2023), and the University of Padova (Italy, starting 2026).

My international experience extends across a Ph.D. at Universitat Jaume I (Spain), postdoctoral training at the Federal University of São Carlos (Brazil), habilitation and appointment as Associate Professor at the Technical University of Liberec (TUL, Czech Republic), and my current role as a Marie Skłodowska-Curie Actions (MSCA) Fellow at the University of Padova (Italy). I maintain active collaborations with groups in Thailand, Brazil, Spain, Italy, Poland, the UK, and the Czech Republic. At TUL, I founded and lead the FEMTO-NANO group, establishing an independent line on laser-synthesized nanomaterials. This line is now evolving into the development of chiroplasmonic superstructures, supported by the prestigious MSCA Individual Fellowship awarded for the project "Laser-assisted synthesis of magnetically motile plasmonic chiral nanocatalysts" (ID: 101151748, 188590.08).

My current focus is on magnetically driven chiral nanomaterials for enantioselective catalysis and sustainable energy, expanding toward adaptive photonics, soft robotics, and on-demand chiral systems. This research has earned institutional (4 thesis awards), national (2 awards), and industrial recognition (1 honorable mention), as well as at the European industrial level through first place at the EIT Jumpstarter Grand Finale 2021 (10000). My involvement in the COST Innovators Grant MET-C (IG19123, 125000) further supports the translation of laser-synthesized nanomaterials toward commercialization.

Overall, my trajectory demonstrates scientific independence, strategic vision, and international recognition, bridging photonics, nanomaterials, and industrial innovation. With strong ties across borders I am determined to reinforce my research program in Spain, where I feel most rooted, and where the Ramón y Cajal framework provides the ideal environment to establish a competitive, interdisciplinary, and socially impactful research line with transformative potential.

Resumen del Currículum Vitae:

Over the past decade, I have built a solid and ascending international research trajectory characterized by scientific leadership, recognition across sectors, and persistent independence. My career spans long-term appointments in Spain, Brazil, and Czechia, where I achieved habilitation and secured a tenure-track Associate Professorship at the Technical University of Liberec (Czech Republic). This progression proves my competence to lead research, supervise multidisciplinary teams, and drive innovation in nanoscience, photonics, and advanced materials engineering, together with a demonstrated ability to attract competitive European funding.

My involvement in major European and national initiatives reflects my scientific calibre and the trust placed in my expertise. I have held key roles in Horizon Europe projects, COST Actions, and Czech research infrastructure and excellence programs. Within these frameworks, I have led laser-mediated nanomaterial synthesis and characterization, coordinated international collaborations, and contributed to pioneering methodologies for catalysis, environmental remediation, and energy applications. This record is strengthened by independent funding success, most notably a highly selective Marie Skłodowska-Curie Individual Fellowship, further confirming my scientific maturity and visibility.

My position in the research community is supported by distinctions including the EIT Jumpstarter Grand Final First Prize, the ANGEL Decennial Award, the Dr. Tasil Prnka Prize, and national recognitions for supervising award-winning theses in the Czech Republic. Beyond these achievements, I contribute actively to the scientific ecosystem as reviewer for Web of Science indexed journals, evaluator for international agencies, chair of international conference sessions, and editor for Journal Special Issues (x2) and co-editing an upcoming Elsevier volume on advanced materials.

My pedagogical record encompasses extensive supervision of undergraduate and graduate theses and international teaching experience, as well as more than seven years as titular lecturer of a graduate course "Functionalization of Nanomaterials", of which I became its academic guarantor. In this role, I oversaw curriculum development, academic standards, and learning coordination, reinforcing my commitment to high-quality training and mentorship.

In parallel, I maintain a strong commitment to scientific dissemination. From early involvement in optics and photonics outreach, culminating in organizing the first OSA international conference for and by students in the Iberian Peninsula, to recent participation in European Researchers' Night Czechia, Science4All Italy, school workshops, and STEM outreach in Spain, where I have consistently fostered public engagement. These initiatives reflect my strong belief in science as a public good and my dedication to integrating outreach, training, and societal impact into my research agenda. Altogether, my record combines competitive funding success, international leadership, research excellence, teaching commitment, and global visibility. I am committed and fully equipped with the know-how to establish a dynamic and internationally connected research program capable of delivering high-impact results, mentoring young researchers, and strategically contributing to Spain's national and international research priorities.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PALACIOS CORELLA, MARIO
Referencia: RYC2025-054260-I
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Título: Harnessing Nanoscale Two-Dimensional Materials for Biomedical Scavenging of Reactive Oxygen Species
(HARMONIUS)

Resumen de la Memoria:

Throughout my scientific career, I have consistently pursued international development, acquiring new knowledge to bring back to Spain as a principal investigator. This journey began with a three-month research internship at ETH Zürich during my Ph.D., under the supervision of Prof. Salvador Pané, an expert in microrobotics. Here, I contributed to developing MOFBOT technology, publishing two articles, one as the first author. This experience challenged me to learn microrobotics and materials science, expanding my expertise.

After completing my Ph.D., I pursued postdoctoral research at the Central European Institute of Technology and the University of Chemistry and Technology under Prof. Martin Pumera. Renowned for his work in microrobotics, 2D materials, and 3D printing. Prof. Pumera granted me autonomy to lead three research lines. I advanced microrobotics, applied surface modification to 2D materials, and explored 3D-printed carbon electrodes, resulting in nine publications (six as the first author). My work contributed to projects led by Prof. Pumera and refined my skills in project management, mentoring, and proposal writing, evidenced by securing a Juan de la Cierva fellowship (declined for my next position).

I then joined Prof. María Ibáñez's group at ISTA, focusing on sustainable nanomaterials for the EU Pathfinder project "MeBattery". Leading the primary research line, I developed nanostructured porous coordination polymers for next-generation redox flow batteries. Prof. Ibáñez entrusted me with a senior role, granting autonomy to manage projects and mentor students. This resulted in several publications and successful grant applications, including the "la Caixa Junior Fellowship".

At ISTA, I expanded my collaborative network across five EU countries, gaining experience in large-scale projects. I also participated in Ph.D. candidate selection and outreach events, such as ISTA's open day, engaging the public with our research.

These international experiences have shaped my scientific versatility and also strengthened my writing and leadership skills, preparing me for future interdisciplinary projects as a principal investigator as the ERC starting grant o the generacion de conocimiento national calls.

HARMONIUS addresses the critical issue of oxidative stress (OS), a key factor in chronic diseases like cancer, cardiovascular, and neurodegenerative disorders. It leverages the unique properties of 2D pnictogen nanomaterials (2D-Pns) such as antimonene, and bismuthene, which offer exceptional ROS-scavenging potential due to their high surface area, reactivity, and tunable properties. However, challenges like poor control over particle size, surface properties and unknown biocompatibility hinder their biomedical use.

To overcome these, HARMONIUS employs controlled colloidal synthesis with ligand-mediated stabilization to achieve biocompatible, sub-200 nm nanosheets. Surface functionalization will be optimized using advanced spectroscopy Moreover integration into Spirulina-based microrobots for targeted delivery to ROS-enriched environments will be explored.

Validated through in vitro ROS scavenging and biocompatibility studies, HARMONIUS offers a scalable, sustainable approach to combating OS-related diseases, paving the way for transformative biomedical and environmental applications.

Resumen del Currículum Vitae:

After earning a bachelor's in chemistry from the University of Valencia, I pursued a research path, completing my Master's (2016) and Ph.D. (2021) in Nanoscience and Nanotechnology at the same university. My Ph.D. focused on synthetic methods for molecular magnetic coordination polymers (CPs), coordination complexes, inorganic clusters, and surface functionalization with stimuli-responsive magnetic molecules.

In the later stages of my Ph.D., I undertook a three-month internship at ETH Zürich under Prof. Salvador Pané, a leading microrobotics expert, where we combined CPs with robotic platforms. Post-Ph.D., I joined Prof. Martin Pumera's group in the Czech Republic, merging my expertise in surface functionalization with 2D materials and 3D printing.

In 2023, I began working with Prof. Maria Ibáñez at IST Austria, developing sustainable materials for redox-flow batteries within the EU-funded "MeBattery" project. In March 2024, I was awarded the prestigious Junior Leader Incoming Fellowship from La Caixa and have since been an independent researcher at the University of Barcelona (UB), hosted by the ChemInFlow group led by Prof. Puigmartí.

In March 2024, I received the highly competitive Junior Leader Incoming Fellowship from "la Caixa", enabling me to establish myself as an independent researcher at the University of Barcelona, hosted by the ChemInFlow group led by Prof. Puigmartí. Within the first year, we published two papers in Advanced Materials. In one, as corresponding author, I investigated the control of fluid-flow phenomena to process magnetic materials into fibres with tunable properties. During this period, I also delivered two invited talks at major international conferences.

To date, I have authored 26 peer-reviewed articles (13 as first and 2 as corresponding author) targeting high-impact, open-access journals, and I have presented my work through 4 invited talks, 7 oral communications, and 4 posters at international events. My trajectory reflects a progressive expansion from inorganic and materials chemistry to microrobotics and, more recently, to controlled fluid-flow phenomena shaping an uncommon



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

interdisciplinary profile. This versatility has been key to securing prestigious projects and fellowships, including the Junior Leader Incoming and Beatriu de Pinós (both in 2024), the Juan de la Cierva (2021), and the Seal of Excellence for two MSCA proposals (2021, 2023).

Beyond research, I have built a strong collaborative network with leading scientists such as Prof. Pané and Prof. Pumera while maintaining ties with former colleagues. Outreach and mentorship play an essential role in my scientific practice: I have participated in public-engagement events such as Die Lange Nacht der Forschung and the European Researchers' Night, and I have supervised students at multiple levels. Over the past year, I directed the master's thesis of Miquel Adell and the bachelor's project of Artur Falcón-Acuña, and I am currently supervising the Ph.D. thesis of Hiroya Takahashi.

In summary, my career reflects a continuous evolution toward the design of multifunctional materials for emerging applications in biomedicine, energy, and magnetic technologies. As an independent researcher, I aim to bridge these fields to develop sustainable and transformative solutions for society.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: HERRERA VASCO, EDWIN
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Título: Direct Atomic-Scale Visualization of Quantum Criticality by Tunneling Microscopy under Strain (ViQuantumCris)

Resumen de la Memoria:

My research focuses on strong electronic correlations in heavy-fermion (HF) systems, topological superconductors, and 2D materials. As a scanning tunneling microscopy (STM) specialist, I have visualized vortex lattices in tilted fields, mapped superconducting density of states, and performed atomic-scale studies at sub-Kelvin temperatures.

I established a HF research line in Colombia and Spain, performing pioneering studies on URu₂Si₂ that revealed quantum well states on U-terraces (Nature 616, 465–469, 2023), uncovered surface symmetry breaking linked to hidden order, and explored chiral superconductivity. My current HF work includes imaging pair density wave in UTe₂ (arXiv:2504.12505v1, 2025) and studying phase separation at quantum critical points. In vortex physics, I measured tilted vortex lattices in b-Bi₂Pd and NbSe₂, uncovering novel Coulomb-like and Josephson vortex interactions.

I am an expert in high-quality single-crystal growth via flux and chemical vapor transport. During my PhD, I mastered flux growth for b-Bi₂Pd and 2H-NbSe₂ (with P. Canfield, Ames Lab, USA). As a postdoc, I extended to 2D-TMDs (2H-TaS₂, TaTe₄) with P. Giraldo (Quantum Mat. Lab, Colombia) (Adv. Elec. Mat. 8, 2200457, 2022; arxiv.org/abs/2507.08192, 2025). At LBTUAM, I initiated research on topological systems, potential Weyl semimetals (AuSn₄, NdSb, WTe₂), and 2D FM van der Waals systems (CrGeTe₃).

These skills enabled international collaborations in Colombia, France, Japan, Sweden, and USA. Over 7 years, I co-authored 12 publications on b-Bi₂Pd, CrGeTe₃, NbSe₂, URu₂Si₂, and TMDs, demonstrating strong impact in condensed matter physics.

I am leading a new HF research line focused on the “Direct Atomic-Scale Visualization of Quantum Criticality by Tunneling Microscopy under Strain” (ViQuantumCris) to study HF systems where uniaxial strain enables direct control of quantum states. By developing a sub-Kelvin STM operating under uniaxial strain, I aim to visualize hidden order, unconventional superconductivity, chiral pairing, f-electron hybridization, and surface-confined correlated phases. This strain-tunable microscope approach will uncover the microscopic mechanisms governing emergent behavior, correlated states, and quantum phase transitions in heavy-fermion systems.

AIM 1: SURFACE QUANTUM ENGINEERING IN HF UNDER STRAIN. STM and QPI spectroscopy will map hybridization gaps, hot spots, and CDW vectors in URu₂Si₂, UTe₂, and Ce-based compounds, revealing how quantum-critical fluctuations shape magnetism and superconductivity. A PhD student will prepare crystals, cleave surfaces, and acquire strain-dependent dI/dV maps to track hidden-order, AFM, and superconducting phases.

AIM 2: LOW-ENERGY QUANTUM-CONFINED STATES AND CHIRAL SUPERCONDUCTIVITY. Scattering under variable strain will identify spin-triplet pairing signatures and quantify surface-bulk interactions in 5f systems, separating intrinsic surface effects from doping-induced inhomogeneities.

This high-risk, high-gain project faces technical challenges, including integrating strain piezo-stacks into dilution-refrigerator STM systems while preserving atomic resolution. Success will advance direct visualization of quantum criticality, unconventional superconductivity, and correlated-electron phases.

Resumen del Currículum Vitae:

My research explores strong electronic correlations in heavy-fermion (HF) systems, topological superconductors, and 2D materials. As an STM expert, I pioneered vortex-lattice visualization in tilted fields, measured superconducting density of states, and performed atomic-scale studies at low temperatures.

I established a HF research line in Colombia and Spain, focusing on URu₂Si₂. I reported the first quantum well states on U-terraces (Nature 616, 465–469, 2023), revealed surface symmetry breaking linked to hidden order, found evidence of chiral superconductivity, and discovered 1D-CDW order (Comm. Phys. 4, 98, 2021).

My current work in HFs includes imaging CDW in UTe₂ (arXiv:2504.12505v1, 2025) and analyzing phase separation at quantum critical points in Ce-compounds.

Since 2024, I am PI of the UAM-Comunidad de Madrid project QUASURF, studying low-energy quantum states via atomic manipulation and surface control in HF crystals. I lead as PI several projects and supervise 5 PhD students (3 director, 2 codirector), including 1 under the first international co-directed PhD agreement with U. Rosario (Colombia) (J. D. Bermúdez), to study Weyl semimetals (WTe₂(1-x)Se(x)) and Fe-based superconductors (FeSe), investigating local symmetry breaking and emergent electronic orders with STM under tilted fields.

I plan to develop a sub-Kelvin STM under uniaxial strain to map hidden-order phases, superconductivity, f-electron hybridization, and surface-confined states, probing chiral pairing and dimensional confinement to uncover mechanisms governing correlated phases and quantum phase transitions.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My PhD at UAM, funded by the Colombian Ministry of Science, led to 5 publications. My PhD scholarship required a 2-year postdoc in Colombia, where, as Co-PI at U. Central, I built Colombia's first STM for charge-order studies in TMDs (Ultramicroscopy 261, 113963, 2024). At U. Andes, I synthesized, exfoliated, and characterized 2D TMDs ($\text{Ta}_{1-x}\text{Mo}_x\text{S}_2$, TaTe_4 , WSe_2) exploring 2D properties, CDW order, and superconductivity (Adv. Elec. Mat. 8, 2200457, 2022; arXiv:2507.08192, 2025). At U. Nacional I participated in developing a theoretical model for low-energy DOS in URu_2Si_2 (Nature 616, 465–469, 2023). Using flux growth and CVD, I synthesized $\text{b-Bi}_2\text{Pd}$, 2H-NbSe_2 , 2H-TaS_2 , and topological systems (AuSn_4 , CrGeTe_3), collaborating internationally and producing 12 high-impact publications (2 first author, 2 second author, 8 coauthor).

In vortex physics, I visualized tilted VL in $\text{b-Bi}_2\text{Pd}$ and NbSe_2 , revealing Coulomb-like and Josephson interactions, quantized vortex-core states, and their coupling to magnetic impurities.

Since 2020, I have contributed to six industry projects (AIRBUS, LIDAX, FIDAMC), designing cryogenic material characterization setups, and co-invented a patent with AIRBUS (2024).

I have 35 publications (639 citations, h-index 14), including Nature, PRL, Nature Comm., PRB, and Comm. Physics (Nature). I lead 4 R&D projects (Spain, Colombia, EU), co-direct 5 PhDs, 8 Masters, and 8 physics theses, 12 international meeting organizations, 11 invited talks. 2 young researcher prizes. Referee for journals (PRL, NanoLetters), funding agencies (Argentina, Colombia, Poland), and national Spanish R&D projects. I have 2 six-year research periods approved by ANECA. R3 certification obtained in 2024.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PÉREZ COMETTO, LUIS ALBERTO
Referencia: RYC2025-057174-I
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Título: Plasmonic solar power: greenhouse gases capture and conversion

Resumen de la Memoria:

In fifteen years, I've contributed to groundbreaking projects spanning various scientific domains and my work has been published in prestigious journals.

One focus has been on nanostructure synthesis and hot electron generation, highlighted by my Marie Skłodowska Curie Actions Individual Fellowship (MSCA-IF) project. This endeavor laid the groundwork for our current project, PLASMOCRACO2, and has been instrumental in evaluating hot electrons in Si inverted pyramid arrays. I've also contributed significantly to theoretical correlations of optical properties, going deeper in the understanding of the involved mechanisms, as evidenced by publications such as "Efficient infrared sunlight absorbers based on gold-covered, inverted silicon pyramid arrays" and "Strong Chiro-Optical Activity of Plasmonic Metasurfaces with Inverted Pyramid Arrays".

Additionally, I've worked with graphene-derived materials and catalysis, exemplified by studies on C-C coupling reactions and the synthesis of Pd@Au nanoparticles supported on rGO flakes. My expertise extends to the characterization of plasmonic/photonic nanostructures and thermal transport phenomena, as showcased in publications like "Electrodeposited Negative Index Metamaterials with Visible and Near-Infrared Response" and "Observation of second sound in a rapidly varying temperature field in Ge."

My independence and leadership shine through in my role as a principal investigator and in my contributions to mentoring and supervising doctoral and master's students. I've also actively engaged in outreach activities to bridge the gap between science and society.

Internationally, my collaborative efforts have led to impactful research outcomes, with nearly half of my papers co-authored with researchers from other countries/regions. This extensive network underscores my commitment to fostering global partnerships and leveraging diverse perspectives to drive innovation. My experience in various research centers across Argentina, Brazil, and Spain has enriched my understanding and approach to scientific inquiry, aligning seamlessly with the demands of modern research.

My proposed research line builds upon my extensive career in plasmonics, focusing on two specialized areas. First, I've advanced the fabrication and characterization of ordered metallic colloid structures through self-assembly (AMI 2024, Nat. Comm. 2025), yielding optical properties comparable to, or surpassing, traditional methods. Second, I've explored inverted pyramid arrays (Mat. Adv. 2022, AMI 2025 + 1 under review), demonstrating their remarkable optical properties and hot electron emission. The future integrates these lines to develop colloid-based structures, leveraging our expertise in pyramidal array fabrication for converting CO₂ into industrial compounds. This novel direction, while distinct from my prior training, leverages foundational physicochemical principles to tackle environmental challenges. This agenda also directly aligns with the strategic objectives of both the EU and the Spanish government, offering substantial value to the Spanish R&D system.

In summary, my multifaceted research track, leadership experience, and international collaborations position me as a dynamic and influential worker in the scientific community, poised to make significant contributions to the advancement of knowledge and societal well-being.

Resumen del Currículum Vitae:

Born in Villa Dolores, Argentina, I have taught undergraduate and postgraduate students since 2009. My commitment to education includes mentoring early-stage students and leading the outreach project "Renewable Energies for a Sustainable Future," giving talks and organizing activities on environmental care and renewable energy. I served as the elected Teaching Assistant and PhD Student Representative on the Governing Councils, demonstrating institutional dedication.

My scientific foundation is in physical chemistry, focusing on nanoscale optics and plasmonics. My bachelor's work (2009) involved functionalizing semiconductor substrates for plasmonic platforms. Doctoral studies (2010-2015) focused on "Optics at the Nanoscale: Plasmonic Nanostructures Design with Application to Ultrasensitive Spectroscopic Detection of Molecules."

A CONICET postdoctoral fellowship (2015) allowed me to investigate graphene's chemical reactivity, measuring energy transfer using Tip-Enhanced Raman Spectroscopy (TERS). That year, I completed a postdoctoral stay at the University of Sao Paulo, engaging in spectroelectrochemistry experiments.

In 2017, I secured a tenure track position at CONICET, working on "Design and Optimization of Plasmon-Enhanced Solar Energy Conversion Devices." Following a relocation to Barcelona (2018), my focus shifted to developing optical techniques (frequency-domain thermoreflectance) for characterizing nanomaterial thermal properties. In 2019, I joined the ENLIGHTMENT project, assembling setups for plasmonic crystal characterization. That same year, I was awarded an MSCA-IF grant to lead the PLASMIONICO project, focusing on thermoionic emitters and hot electron management.

I extended PLASMIONICO concepts to perovskite thin films during a secondment at the University Jaume I (2021). In 2022, I resumed work with the NanoPhotonics group, focusing on assembling colloidal metal nanoparticles for 2D photonic nanostructures, and conducted measurements of



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

molecular-induced chirality at BioMaGUNE. In 2023, I launched PLASMOCRACO₂, a project synthesizing my experience in plasmonic nanostructure design and physicochemical background for the photocatalytic conversion of CO₂ into industrially relevant products.

Over the past year, I have begun my journey toward research independence as a Principal Investigator (PI), securing projects in programs such as CSIC-Fulbright 2025 and iMOVE 2025, and submitting a proposal to ICOOP 2025.

I have published 41 articles/publications (36 peer-reviewed, 2 under review), including 1 book chapter and 1 dissemination article. I have served as main, shared first, or corresponding author (6) on 15 of these publications. I have supervised 2 Master's students and am currently co-supervising 1 PhD student, in addition to serving on thesis committees at UAB.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: ROLLI PEREZ, PHILIPPE
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Título: Engineering Vibronic Nanosystems for Next-Generation Optical and Biomedical Applications
Resumen de la Memoria:

During the Ramon y Cajal program, I will lead a research line focused on a specific class of molecular vibrations known as vibronic modes. The uniqueness of these modes lies in their intrinsic electromechanical coupling, which links a molecule's electronic and vibrational states and enables strong interactions with optical fields across different spectral regions. Building on this property, vibronic modes can act as electro-opto-mechanical interfaces capable of mediating signal transduction between distinct physical channels—making them highly attractive for emerging nanotechnologies. One rapidly developing area is infrared-to-visible (IR-to-VIS) upconversion, which has so far relied, among others on lanthanide-doped nanoparticles or conventional molecular vibrations. Introducing vibronic modes into this context offers a new approach with the potential to advance next-generation infrared technologies, including single-photon sources and efficient room-temperature infrared sensors. Intriguingly, molecules exhibiting these modes are additionally being explored as a new class of light-driven molecular machines, also referred to as molecular jackhammers. Upon optical excitation, the mechanical action of vibronic modes has already shown significant potential for biomedical applications, such as the selective targeting and eradicating of cancer cells through perforation of diseased cell membranes.

Developing optical schemes that (i) precisely and actively tune the coupling between vibronic molecules and their surrounding optical environment and (ii) strengthen the mechanical action of vibronic molecules at the single-molecule level remain outstanding challenges. Over the years, plasmonic nanocavities have proven highly effective for probing molecular properties, achieving single-molecule sensitivity using various optical techniques, including fluorescence, Raman, and pulsed nonlinear spectroscopies. During my stay at CIC nanoGUNE, I combined state-of-the-art plasmonic nanocavities with the scanning metallic tip of a near-field optical microscope (s-SNOM). The tip-enhanced nanocavities I introduced function as active, broadband nanolenses spanning both VIS and IR spectral regions. Combined with the unique and versatile microscopy platform I developed, they enable simultaneous VIS-IR and nonlinear molecular nanospectroscopy, providing an exceptional framework to address these challenges.

Building on this foundation, the proposed research line focuses on the exploration of vibronic modes within tailored optical environments and down to the single-molecule level. I will pursue three complementary research directions that rely on the same instrumentation and sample designs while addressing distinct scientific questions. The anticipated advances include: (i) the demonstration of in situ tunable strong coupling in nanocavities, (ii) the development of optical schemes to control and enhance the mechanical action of molecular jackhammers, and (iii) the observation of nonlinear IR-to-VIS upconversion at the single-molecule level. Together, these advances will establish a distinctive research trajectory, capable of driving innovative optical and biomedical technologies based on molecular machines.

Resumen del Currículum Vitae:

I completed my PhD in Physics at EPFL, Switzerland, working in the world-leading group of Prof. Tobias J. Kippenberg (Marcel Benoist Prize laureate) where I made pioneering contributions at the intersection of nanophotonics, molecular spectroscopy, and quantum optics. My PhD research introduced the paradigm of molecular optomechanics (Nature Nanotechnology), proposed a novel scheme for single-infrared-photon detection (Physical Review X), established new experimental platforms for nanoscale spectroscopy (Nature Communications), and contributed to the first demonstration of coherent infrared-to-optical frequency conversion under continuous-wave illumination (Science).

I secured highly competitive fellowships for my postdoctoral research work. First a Swiss National Science Foundation Mobility Grant and subsequently a prestigious Marie Skłodowska-Curie Actions Fellowship, to pursue independent research in the group of Prof. Rainer Hillenbrand at CIC nanoGUNE. There, I led the development of a unique scanning probe microscopy platform and introduced a new class of active nanostructures, termed tip-enhanced nanocavities, resulting—among other works—in a Light: Science & Applications publication as first and corresponding author.

I have co-supervised three master's students at EPFL. At CIC nanoGUNE, I co-directed two master's theses (Priyansi Sahu, "Graphene-spaced Nanoparticle-on-Mirror: A tunable nanostructure for nonlinear optics"; and Naia Soler, "Quantum study of higher-order vibrational sidebands in molecular optomechanics") and currently co-supervise a PhD candidate (Iker Herrero) working on vibrational strong-coupling in phonon-polariton nanocavities.

I have built a robust international research network through joint publications with leading groups at the Max Planck Institute for the Science of Light, the University College London, the AMOLF Amsterdam, and the Freie University of Berlin. These collaborations were established and strengthened during my time at the Max Planck-EPFL Center for Molecular Nanoscience and through my involvement in the European FET-OPEN project THOR on molecule-enabled terahertz detection. My research visibility is underscored by 5 invited talks, 6 invited seminars, 20 contributed talks, 2 poster awards, and media coverage of my results through News & Views articles and science communication outlets.

Beyond my scientific track-record, I have demonstrated strong commitment to teaching, outreach, and open science. I served as head teaching assistant during my doctoral studies, receiving the EPFL Physics School teaching prize. I organized EPFL's Physics Day in 2017 and 2018, featuring Nobel laureates Prof. Claude Cohen-Tannoudji and Prof. Stefan Hell and engaging over 250 participants and contributed to Pint of Science outreach event in Spain. I am also the creator and manager of the Molecular Vibration Explorer, a freely accessible web application that provides datasets and analysis tools for quantum-chemistry-based optical spectroscopy, reflecting my dedication to open-access dissemination of scientific resources.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Through the combination of conceptual innovation and experimental expertise, I have built a strong interdisciplinary profile, with research that opens new directions and paves the way for technological applications in infrared detection, sensing and molecular nanotechnology.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: FRANK , ERIK THOMAS
Referencia: RYC2025-054539-I
Correo Electrónico: erik.frank@uni-wuerzburg.de
Título: Evolution of social wound care behaviours in animals

Resumen de la Memoria:

My research focuses on the evolution of social wound care behaviors in animals, an emerging field that advances our understanding of cooperative behaviors and social immunity. Recently, I have expanded my research to also study broader social immunity concepts in ants, bees, and wasps, as well as the use of insects during wound care in chimpanzees.

During my PhD, I discovered that termite-hunting ants actively rescue and treat injured nestmates, challenging long-held assumptions that injured individuals in insect societies are expendable. I found that workers not only transport their wounded back to the colony but also developed a sophisticated wound care treatment inside the nest. These behaviours significantly improved the injured's survival, demonstrating that saving the injured was vital for the overall survival of the colony.

During my postdoctoral research in Switzerland, I aimed to understand how ants could treat infected wounds. I discovered that ants apply secretions from their metapleural glands, which contain potent antimicrobial compounds, to infected wounds. These secretions contain over 112 chemical compounds and 41 proteins, at least half of which exhibit antimicrobial properties. This antimicrobial cocktail proved highly effective in reducing bacterial growth, including in multi-resistant pathogens, highlighting the biomedical relevance of my work and its potential applications in antibiotic development.

In 2021, I returned to Würzburg to establish my independent research group to study the evolution of social wound care. Recently, I discovered the first case of a non-human species conducting prophylactic leg amputations to save conspecifics in Carpenter ants. This stands in contrast to the therapeutic antimicrobial wound care observed in other ant species, highlighting the diversity of strategies that social insects have evolved to manage injuries. The evolutionary and physiological factors driving these differences are now the focus of a new PhD project, in which we investigate why some species amputate while others rely on antimicrobial treatments.

In 2024, I expanded my research into inter-kingdom wound care interactions between ants and plants, by investigating whether mutualistic ants contribute to their host plant's wound healing in Costa Rica. Since the ants depend on the survival of the tree for their own survival, they have a high interest in keeping the tree healthy. This project is the first to study wound healing interactions between animals and plants and offers a unique opportunity to identify new compounds with potential benefits in plant care.

Overall, my research has not only reshaped the field of social immunity but has also had a significant impact on multiple disciplines. By integrating behavioral ecology, chemical ecology, microbiology, and evolutionary biology, I have contributed to a better understanding of how cooperative behaviors evolve and persist in animal societies. My findings have challenged traditional assumptions about the expendability of injured individuals in eusocial groups and have demonstrated that social insects can exhibit complex medical behaviors. In doing so, my research not only provides transformative insights into animal behavior but also has major implications for medical sciences and philosophy, demonstrating the broad impact of my discoveries.

Resumen del Currículum Vitae:

I lead an independent research group at the University of Würzburg funded by the DFG Emmy Noether Programme. My research integrates behavioural, chemical, and evolutionary ecology to understand how social insects diagnose and treat injuries, revealing striking parallels with human medicine and identifying promising antimicrobial compounds in the process.

I started my career with the Graduate School of Life Sciences PhD Scholarship which allowed me to conduct my research on the topic of my choice: rescue and wound care behaviour in termite-hunting ants, behaviours that I first discovered during my Master thesis in Ivory Coast. This kickstarted my career by describing the first sophisticated wound care system in insects (Frank et al. 2017, 2018) and laid the foundation for my future research on social wound care in animals.

As a postdoctoral researcher at the University of Lausanne (2018-2021), I investigated the mechanisms of antimicrobial wound care on infected wounds using genomic, proteomic, chemical, behavioural, and microbiological approaches. I showed that ants can detect and combat infected wounds by applying antimicrobial secretions from their metapleural glands on them (Frank et al. 2023). Chemical and proteomic analyses of the secretions led to the identification of several novel compounds and peptides with antimicrobial potential.

After returning to Würzburg (2021-2022) as Akademischer Rat (senior postdoc), I expanded my research to study the evolution of social wound care in ants. This led me to discover prophylactic leg amputations in Camponotus ants as a novel form of wound care, a first in the animal kingdom (Frank et al. 2024, Fujimoto et al. 2025).

In 2022, I established my own Emmy Noether group to study the evolution of wound care behaviours in animals. In 2024, I was awarded the Hector Research Career Development Award to explore "inter-kingdom wound care" in ant-plant mutualisms, aiming to identify new bioactive molecules involved in plant healing used by ants and expanding the field of social woundcare to inter-species interactions.

I also secured funding for a new project in 2025 (DFG) to study the evolution of amputation behaviours in ants and I am co-supervising a PhD project on insect use during chimpanzee wound care in Gabon. My team thus currently includes one postdoctoral researcher and five PhD students. I have also supervised 36 Bachelor's and Master's theses and contributed to the development of new teaching modules in behavioural and chemical ecology. In total, I have secured more than 2 million € for my research (as main recipient) and published a total of 21 peer-reviewed articles, 9 as first author and 4 as last author.

I am also an avid science communicator. My work has been featured in over 500 international media articles and in four nature documentaries. I also authored a popular science book *Combattre, Sauver, Soigner: une histoire de fourmis* (CNRS Éditions, 2020), an autobiographic book focused on my research and what it means to conduct a PhD in the tropics.



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Turno General

Through my research, I seek to uncover the evolutionary and ecological foundations of wound care in animal societies. My work has helped redefine how cooperation, disease management, and pro-social behaviour are understood in social insects and has been recognised with the Röntgen Prize 2025 and my admission in the Hector Fellow Academy.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: LEZCANO VEGA, MARÍA DE LOS ÁNGELES
Referencia: RYC2025-055628-I
Correo Electrónico: mangeles.lezcano@gmail.com
Título: Ecological impacts and mitigation strategies for harmful cyanobacterial blooms and emerging contaminants across aquatic and terrestrial ecosystems

Resumen de la Memoria:

My research career began with the study of the ecology of toxic cyanobacteria during my Bachelor and Master's thesis at the Autonomous University of Madrid (UAM, Spain). During my PhD at IMDEA Water and UAM, my work focused on the biodegradation of microcystins –the most widely distributed cyanobacterial toxins worldwide. Throughout this period, I made significant contributions to the understanding of the genes and metabolic pathways of microcystin biodegradation in the environment and the fate of microcystins in aquatic systems. My research also led to the development of a biotechnological application based on bacterial removal of microcystins from water, resulting in an International Patent. During this period, I acquired experience in a broad range of techniques, including real-time PCR, DNA metabarcoding and advanced mass spectrometric techniques. I also developed research stays at universities and institutions in Sweden, Finland, Norway and Czech Republic.

After my PhD, I continued my research career as a postdoctoral researcher at the Centro de Astrobiología (INTA-CSIC), first with a FSE-YEI Fellowship and later with a Juan de la Cierva Fellowship. During my postdoc, I studied the microbial ecology of extreme environments (e.g., hydrothermal systems, Antarctic ice-shelves and hot deserts) and the preservation of biomolecules (DNA, proteins, and lipids) in ancient samples for paleobiological reconstructions. During this period, I developed strong leadership skills and broadened my international collaborations. I also acquired expertise in genome-resolved metagenomics, metaproteomics and lipid biomarker analysis. I performed a research stay at the University of Duisburg-Essen to learn genome-resolved metagenomics. During this period, I made significant scientific contributions to the understanding of microbial diversity and metabolisms in extreme environments, such as Andean lakes and Antarctic ice and air, through international collaborations (e.g., SETI Institute, and University of Duisburg-Essen).

Since 2022, I have been a researcher at IMDEA Water (Madrid, Spain), where I lead a team of researchers and research assistants, and I have established an independent research line focused on the impact of environmental stressors –both chemical and biological– on aquatic and terrestrial biodiversity, as well as on the development of bioremediation strategies to mitigate these effects. I have successfully received funding as Principal Investigator for 5 National and European research projects, in collaboration with national and international institutions. During the Ramon y Cajal contract, I will consolidate and expand this research line by developing the following research topics, shaping a long-term, independent research trajectory: (i) Impact of toxic cyanobacterial blooms on aquatic and terrestrial ecosystems, (ii) Impact of microplastics and their additives on soil microbiome, (iii) Origin and causes of odour compounds in aquatic ecosystems, (iv) Bioremediation of cyanotoxins in water, and (v) Bioremediation of biodegradable microplastics on soils. All these research topics are grounded in the skills acquired throughout my scientific career, particularly a deep understanding of aquatic and terrestrial microbial ecology together with advanced molecular biology techniques developed during my postdoctoral period.

Resumen del Currículum Vitae:

PhD in Microbiology (2017). About 17 years (since 2008) doing research in microbial ecology and bioremediation in 8 National and International R&D centers. Researcher at IMDEA Water (Spain). I have published 23 articles (68% in Q1, and 45% as first/last/corresponding author), 1 International Patent and 1 book. Citations and H-index: 560 and 13 (Scholar), and 445 and 12 (Scopus). Evaluator expert for the Spanish State Research Agency, the Czech Academy of Sciences, PhD boards, and Review Editor in Frontiers in Microbiology. Scientific advisor to companies and institutions, e.g., SACYR S.A. and the Military Emergency Unit.

My research career started as an undergraduate and Master student (2008-2011) in the group of Prof. Antonio Quesada (Autonomous University of Madrid, Spain). I received funding from 4 research grants to study the ecology of Antarctic microbial mats and toxic cyanobacteria in aquatic systems. I started my own research, and I carried out a stay at Mälardalen University (Sweden).

After my Master studies, I developed my PhD (2012-2017) at IMDEA Water under the supervision of Dr. Rehab El-Shehawey and Prof. Antonio Quesada. I studied the genetics and ecology of toxic cyanobacteria, and the biodegradation of cyanotoxins. As a result of my PhD, I am author of 1 International Patent (PCT/ES2016/070026) with a method for the use of a bacterium for the removal of cyanotoxins from water. The patent has been approved in USA, Australia and Europe. I carried out research stays at Åbo Akademi University (Finland), and at Telemark University College (Norway).

After my PhD, I continued my career as a postdoctoral researcher at the Centro de Astrobiología (INTA-CSIC) (2018-2022) in the group of Dr. Víctor Parro. I received funding from two research grants (160700 – in total): a FSE-YEI Postdoctoral Fellowship (Ref. PEJD-2017-POST/TIC-4119), and a Juan de la Cierva Postdoctoral Fellowship (Ref. FJC2018-037246-I). My research was focused on the microbial ecology of extreme environments by analysing biomolecules (DNA, proteins, and lipids) using –omics– techniques. I conducted a research stay at the University of Duisburg-Essen (Germany) with Prof. Alexander J. Probst to develop genome-resolved metagenomics.

In November 2022, I joined IMDEA Water Institute. I have supervised a team of 4 PhD candidates, 7 research assistants and 1 undergraduate student. I currently lead 6 National/European projects: (i) PI of HUMEBIOTA (Ref. 3399/2025, provisional), to assess the impact of harmful cyanobacterial blooms on aquatic microbiota and the gut microbiota of waterfowl; (ii) PI of CyaNoTox (Ref. PID2023-151413OA-I00), to scale up the use of a cyanotoxin-degrading bacterium from laboratory to semi-real environmental conditions; (iii) Coordinator and PI of the European project CyaNoServices (Ref.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Water4All2023-38), to evaluate the impact of harmful cyanobacterial blooms on pollinators and emerging insects; (iv) PI and supervisor of the Industrial PhD project Geo2M (Ref. ND2024/amb-34116), in collaboration with Canal de Isabel II, to investigate the origin of geosmin in reservoirs; (v) PI and supervisor of the PhD project DEGRAPLAS (Ref. PIPF-2024/ECO-34251), to investigate the impact of biodegradable microplastics on agricultural soil microbiomes; and (vi) PI of the international collaborative project "Thin Ice Network Lakes" (Ref. 2306894).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MAZARRASA ELÓSEGUI, INÉS
Referencia: RYC2025-056360-I
Correo Electrónico: imazarrasa85@gmail.com
Título: Understanding the role of coastal and marine ecosystem conservation and restoration for climate change mitigation

Resumen de la Memoria:

I am a marine ecologist. My research focuses on the role coastal vegetated ecosystems (CVEs) play as natural carbon sinks and how their conservation and restoration can contribute to climate change mitigation. The contribution of CVEs (mainly seagrasses, saltmarshes and mangrove forests) to the global carbon cycle and their capacity to act as carbon sinks through the accumulation and storage of organic carbon (Corg) in sedimentary deposits have been known for decades. However, the potential implementation of CVEs conservation and restoration actions as climate change mitigation strategies (known as blue carbon strategies) is a recently novel paradigm. Blue carbon has attracted a lot of attention from the scientific community, conservation practitioners and the policy arena as it constitutes an opportunity to enhance and support the protection of historically threaten ecosystems and all the ecosystem services they provide through climate change mitigation frameworks traditionally restricted to terrestrial forests. When I started my PhD in 2010, research on Blue Carbon was on its infancy and there were key gaps of knowledge that needed to be filled in order to develop and implement blue carbon strategies.

My research has significantly contributed to fill some of these gaps. I have increased the knowledge on the magnitude and drivers of variability of sedimentary carbon deposits, carbon burial rates and carbon origin in seagrass meadows and saltmarshes across different regions (e.g. Mediterranean, Oceania, Europe) and worldwide. In addition, I have examined the impact that habitat degradation due to human impacts in coastal areas has on blue carbon habitats and their associated carbon sinks and how conservation and restoration actions can contribute to the maintenance and recovery of this key ecosystem service. I have addressed critical issues in Blue Carbon science such as the accumulation of inorganic carbon in the form of CaCO_3 in the soil of seagrass meadows, which has important implications in the role of these habitats as net carbon sinks due to the release of CO_2 during carbonate precipitation. More recently, I have started to expand the focus of my research to other benthic habitats, which contribution to carbon storage in marine sediments had been traditionally neglected (e.g. macroalgae).

I aim to support the development of well-informed policies and management frameworks for the conservation and restoration of coastal vegetated ecosystems as an ecosystem-based approach for climate change mitigation. Thus, I have participated in several knowledge transfer projects and capacity building actions and I have been deeply engaged in communicating my research to relevant stakeholders and the general society through seminars, courses and technical and outreach publications.

Building on my previous work and experience, I aim in my future research to improve our understanding of the role that macroalgae and other benthic and threaten habitats (e.g. maerl beds) play in carbon cycling, and to contribute to the development of conservation strategies that integrate biodiversity objectives and additional ecosystem services. In addition, I aim to understand the influence of seascape-scale processes (e.g. habitat connectivity) in carbon storage and the impacts of climate change in habitat distribution and carbon storage capacity.

Resumen del Currículum Vitae:

I hold a PhD in Marine Ecology. My research focuses on the role coastal vegetated ecosystems play as long-term carbon sinks. I have published 26 peer-reviewed papers, 11 as first author (2,756 citations, h-index 17).

My work has significantly advanced understanding of the ecological and biogeochemical mechanisms underpinning carbon storage in seagrasses and saltmarshes and their potential for climate-change mitigation through conservation and restoration (i.e. Blue Carbon strategies). I have demonstrated that carbon-storage capacity varies widely within and across blue carbon ecosystems due to environmental and biotic drivers. I have also shown that habitat degradation from human activities reduces the carbon-sink function of these ecosystems while conservation and restoration actions support its maintenance and recovery. Additionally, I identified seagrass meadows as major global deposits of inorganic carbon (as CaCO_3) and examined the implications of CaCO_3 precipitation for their net carbon balance. My research further revealed that other coastal habitats, previously overlooked as blue carbon sinks, such as macroalgal forests and tidal flats, also contribute to carbon storage through biomass export or accumulation of allochthonous carbon. I have also contributed to several methodological studies aiming at improving the accuracy of Blue Carbon assessments.

My expertise extends to applied and knowledge-transfer projects with public agencies, NGOs, international organisations and private companies. These collaborations include updating the Mediterranean *Posidonia oceanica* distribution map for the European Topic Centre (University of Málaga) and SPARAC, evaluating the quality of Blue Carbon offset projects for the French Global Environment Facility, supporting United Nations-IAEA efforts to harmonise Blue Carbon methodologies, and contributing to training events for managers and private-sector actors. I am an active member of scientific programmes that aim to advance Blue Carbon knowledge for supporting evidence-based climate strategies, including the Spanish Blue Carbon Expert Group (GE3CA), the UN Ocean Decade programme for Blue Carbon and The Seagrass Consortium.

I have broad experience in outreach and environmental education, organising workshops, talks and public activities with research centres, NGOs and companies. I have coordinated a summer school, lectured in several national and international courses, and developed online training resources for European and national projects. Within the Doctoral Programme of the University of Cantabria, I have evaluated doctoral progress and taken part in MSc thesis committees. I have supervised four MSc students and currently co-supervise a PhD student.

I have led two competitive research projects and participated in more than ten national and international projects on ecosystem services, coastal ecosystems vulnerability to global change and nature-based solutions to climate change. My career has been supported by two national postdoctoral fellowships (Juan de la Cierva Formación and Juan de la Cierva Incorporación) and two international mobility grants (Fundación Santander Investigación and José Castillejo Fellowship) that enable me to conduct two international research stays in Costa Rica (4 months) and Australia (6 months).



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Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: BRANDS, SWEN

Referencia: RYC2025-055943-I

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Título: Trayectoria Investigadora de Swen Brands

Resumen de la Memoria:

During the last 15 years, I have developed 5 independent research lines dedicated to 1. the quantification of reanalysis uncertainties and their implications for downscaling and climate model evaluation, 2. the evaluation of global climate model (GCM) experiments from the Coupled Model Intercomparison Project (CMIP), 3. the study of teleconnections in the climate system and their implications for climate predictability, 4. the exploration of the Atmospheric River (AR) phenomenon related to extreme precipitation events, and 5. the exploration of internal climate variability (ICV) and its implications for model evaluation and climate predictability. Due my expertise in these fields, I was invited to participate in 4 large international research initiatives: The Atmospheric River Tracking Method Intercomparison Project (ARTMIP), where I represent a European perspective on AR science, and 3 initiatives of the World Climate Research Programme (WCRP), where I have leading roles regarding model selection and data use guidance for downstream applications: 1) The Coordinated Regional Climate Downscaling Experiment, 2) The CMIP Model Benchmarking Task Team, and 3) the RfS-CMIP Responsible Data Use Task Team. I am co-principal investigator of the "GENERACIÓN DE CONOCIMIENTO, CONVOCATORIA 2024" project "CONTRIBUCION ESPAÑOLA AL ATLAS DEL IPCC-AR7: DESARROLLO Y PROBLEMAS CIENTIFICOS" (PID2024-162703OB-I00), which will implement process-based model evaluation methods in the IPCC WG1 Interactive Atlas, aligning with the activities of the aforementioned WCRP initiatives. Moreover, I am the work package coordinator of the seasonal prediction services currently being implemented in PTI Clima.

The research line I would like to propose for a Ramón y Cajal contract is aligned with the future development of the aforementioned three WCRP initiatives and their possible follow-ups, as well as the IPCC WG1 Interactive Atlas and Rapid Evaluation Framework developed for CMIP7: I propose a comprehensive model evaluation approach based on key climatological phenomena relevant on the regional-scale, particularly considering extreme events, to provide informed model selection criteria. I focus on synoptic to meso-scale atmospheric processes in the tropics and extratropics and evaluate the models along four dimensions currently applied in CORDEX: Model performance, ensemble diversity, spread of future outcomes and model complexity. In addition to preindustrial, historical and scenario simulations from CMIP, I will also evaluate initialized climate forecasts (seasonal and decadal). I will put particular emphasis on the critical analysis of the internal climate variability, forced responses and signal-to-noise ratios produced by these simulations.

These efforts will provide more reliable climate information at the regional scale from which downstream applications will largely benefit. A proper sampling of ICV is key for climate system understanding, with benefits for trend detection, extreme event attribution and uncertainty estimation. It is also highly relevant for the provision of climate services, particularly for risk assessments of dangerous weather events.

Resumen del Currículum Vitae:

Swen Brands was born and grew up in Germany. He holds a higher-level postdoctoral position at Instituto de Física de Cantabria (IFCA). He is co-principal investigator (co-investigador principal) of the "GENERACIÓN DE CONOCIMIENTO, CONVOCATORIA 2024" project "CONTRIBUCION ESPAÑOLA AL ATLAS DEL IPCC-AR7: DESARROLLO Y PROBLEMAS CIENTIFICOS" (PID2024-162703OB-I00, 200 thousand EUR + 1 FPI grant). He is responsible for the model evaluation work package, aligned with his activities in currently 3 WCRP task teams: the CMIP Model Benchmarking task team, the RfS/CMIP Responsible Data Use Task Team, and the CORDEX Task Team on Protocols and Infrastructure. He was principal investigator of a two-years contract with EDP (12 thousand EUR). The value of the 8-years project CHIMERE he led as a PI at MeteoGalicia, contracted by the Galician government, is 540 thousand EUR. The total funding he obtained as PI or co-PI is 752 thousand EUR + 1FPI grant. He is work package coordinator of the seasonal prediction climate service in the PTI Clima. He is scientific advisor of two Plan Estatal projects (TED2021-130702B-I00 and PID2023-150234NB-I00) and of the Galician Ministry of Environment. In addition to his 3 PI roles mentioned above, he was team member of 1 EU FP7 project, 1 Plan Nacional project, 1 EU COST action, and 2 previous WCRP-CORDEX activities. He holds a first-class Magister degree from RWTH Aachen University with the main subject Physical Geography (10/2009). He obtained his PhD in Ciencias, Tecnologías y Computación from University of Cantabria (UC, 10/2017). He was a project scientist at the Dept. of Applied Mathematics at UC (11/2009-10/2011). He held a JAE-PREDOC grant at IFCA (11/2011-06/2015). He has led 6 independent research lines dedicated to 1. reanalysis uncertainty (Brands et al. 2012), 2. Climate model evaluation (Brands et al. 2013, Brands 2022a,b) 3. Teleconnections and climate predictability (Brands et al. 2012a, Brands et al. 2014), 4. Atmospheric river research (Brands et al. 2017, Rutz et al. 2019, O'Brien et al. 2021) 5. Internal climate variability (Brands 2017, Brands et al. 2023a), and 6. Numerical air chemistry modelling (Brands et al. 2020). He is co-director of 1 MSc thesis (TFM) at UC and has supervised the traineeships of 5 Master and 4 Bachelor students at MeteoGalicia. He has been a member of 4 international PhD thesis evaluation committees. He has evaluated 1 project proposal for the Deutsche Forschungsgesellschaft and is reviewer for Science Citation Index journals. He taught 60 hours at RWTH Aachen University (Germany) and 2 at USC. He led dissemination reports and events for the Galician government, and currently is an active member of IFCA's dissemination team. Swen has an H-index of 20 according to google scholar (Scopus: 18). He has published a total of 34 JCR articles: 17 first-author (5 of them single-author), 17 co-author (Q1: 25, Q2: 7, not IF yet: 2, I refer to Q on publication date) and 3 book chapters (1 first author, 2 co-authored). Swen has 25 international congress contributions. Three of them were invited talks (e.g. at EMS2022). A complete list of his scientific production is available from his ORCID.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: PETIT BOIX, ANNA
Referencia: RYC2025-056867-I
Correo Electrónico: anna.petit@uab.cat
Título: Circular strategies and tools for a sustainable resource management in cities
Resumen de la Memoria:

Dr Anna Petit Boix's career stands out for the application of tools from the field of industrial ecology, such as life cycle assessment, to improve the environmental performance of water management systems, food production, and local resource recovery in the context of the circular economy in cities. Her research has a strong interdisciplinary component and thus integrates knowledge from the social-natural sciences and engineering into her studies in the form of new conceptual frameworks, co-creation processes with social actors and tools for social impact. To do so, she relies on a strong network of international collaborations to elaborate high-quality sustainability assessments of circular economy strategies.

During her doctoral training at ICTA-UAB (2013-2017), her research focused on the environmental analysis of the urban water cycle, including sewers or rainwater harvesting strategies, which made novel contributions to the field. Her postdoctoral stage at the University of Freiburg (Germany, 2017-2021) led to a series of groundbreaking studies aiming to conceptualize and evaluate circular economy strategies in cities. She published the first study to synthesize 300 circular economy initiatives reported in cities around the world and their coverage in environmental assessments, which was recognized with research awards and invited talks. Together with the Circulus team, she is the co-author of a highly downloaded publication that formulates the main narratives and research agenda for a sustainable circular economy. Since her return at ICTA-UAB with a María Zambrano grant (2022), she has delved into the circular economy of food production in cities, with a special focus on nutrient recovery. She participated in the environmental assessment of a novel urine recovery system for urban agriculture that has gathered media popularity and impact at the societal and industrial level. More importantly, she is currently highly engaged in knowledge transfer activities with Catalan schools. In the past three years, she has coordinated co-creation activities with school teachers and students to integrate circular economy knowledge into school curricula, particularly in the field of sustainable food. With the evolution of her research career, her current and future goals are set on:

(1) identifying and evaluating innovative local resource flows for food production in cities. Nutrient recovery and food production are at the core of her current and future research. She is currently conducting environmental assessments related to alternative fertilizers for urban agriculture, including urine and carbon capture. Social acceptance and co-creation processes are also part of all her assessments.

(2) facilitating citizen participation and access to knowledge through co-creation with the education sector. Given her recent experiences with schools, Dr. Petit Boix aims to create a network of schools interested in integrating the circular economy and sustainable food into their educational curriculum. She has five formalized agreements with schools. By doing so, the candidate aims to structure the knowledge transfer from her studies and the Sostenipra group to facilitate the co-creation of educational content and the integration of scientific knowledge into society.

Resumen del Currículum Vitae:

Dr. Anna Petit Boix is a researcher with 12 years of experience in the field of environmental research. She is currently affiliated with the Sostenipra research group (2021 SGR 00734) at the Institute of Environmental Science and Technology (ICTA-UAB). Her more relevant contributions are:

1. Scientific contributions. The candidate applies tools from the field of industrial ecology, such as life cycle assessment, to improve the environmental performance of water management systems, food production, and local resource recovery in the context of the circular economy in cities. Between 2014 and 2025, she has published 44 peer-reviewed articles (h-index: 25; 2,176 Scopus citations). She has received recognitions such as the extraordinary doctoral award (UAB) and the Helmut Lieth Prize from the University of Freiburg (Germany). Her articles have accumulated 51 citations in high-impact political documents such as the IPCC's Sixth Assessment Report (2022). She has participated in the development of 19 third-party funded projects at the regional, national, and EU levels. Her degree of leadership is reflected in her time as deputy research group leader at the University of Freiburg, her return to ICTA-UAB with a María Zambrano grant, and her work as co-PI and WP leader in international projects.

2. Contributions to society. The candidate coordinates the Sostenipra's scientific communication. Over the past three years, she has co-created learning activities with primary school teachers and students and formalized five collaboration agreements with schools. During this period, she has interacted with more than 800 students through experimental sessions, guided tours at ICTA-UAB, scientific talks, mentoring, and video game design. She participated in the development of the FoodE App to bring local and sustainable food closer to consumers (>220 European food initiatives and >400 users).

3. Training and management contributions. Since her predoctoral stage, the candidate has accumulated more than 850 hours of undergraduate and master's degree teaching in the field of environmental sciences at UAB. She has also participated in teaching activities at the University of Freiburg and the University of Barcelona, and in the creation of the UAB MOOC in 2025 that has more than 530 students. She has co-supervised two finalized doctoral theses (with two on-going), 39 Master's and 24 Bachelor's theses. She has been a member of the Academic Board of the Doctoral Program in Environmental Science and Technology since 2024. She has participated in the SAES Master's curriculum reform in 2025, where she served as sub-coordinator of the Master's theses of the Industrial Ecology Track (2023-2025).

4. Contributions to the scientific community. The candidate is involved in the editorial activities of the journals Temes de Disseny (Elisava) and Cleaner Environmental Systems (Elsevier). She received the Excellence in Review Award 2020 from Resources, Conservation & Recycling, two awards for best



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

poster at international conferences and an Environmental Science award. She co-led the conference committee of the International Society for Industrial Ecology (2019-2023), co-chaired the 1st Industrial Ecology Day (2021) and was committee member of the Interdisciplinary Circular Economy Conference 2020 and the 1st International Life Cycle Assessment Symposium (Barcelona, 2025).



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: COLEINE, CLAUDIA
Referencia: RYC2025-054964-I
Correo Electrónico: cla.coleine@gmail.com
Título: Global change impacts on microbial life in extreme ecosystems and innovative predictive frameworks for ecosystem resilience

Resumen de la Memoria:

I am an environmental microbiologist specialized in extreme ecosystems, with an international trajectory in dryland ecology, extremophile biology, environmental mycology and astrobiology. My research integrates global field campaigns across deserts, Antarctic and alpine environments with multi-omics, ecological modelling, and bioinformatics. Since 2018, I have published over 80 peer-reviewed papers, more than half as first, corresponding or senior author, in high-impact journals including Nature Microbiology, The ISME Journal, Microbiome, Fungal Diversity, and Trends in Ecology & Evolution, and I have generated more than 15 open-access global datasets. My work has driven major conceptual advances: the demonstration of critical aridity thresholds triggering abrupt soil biodiversity collapse, the discovery of previously unknown genomic signatures of adaptation in Antarctic microorganisms, and the development of the first climate-based global atlas of soil-borne fungal pathogens, with direct implications for One Health strategies.

I have independently led field expeditions in extreme environments, designed original analytical pipelines, and coordinated large international networks. Notably, I founded ROCKFUN, the first global consortium dedicated to rock-inhabiting microbial communities, now gathering more than 50 institutions and providing standardized multi-omics protocols and shared infrastructures. My independence is demonstrated by the fact that >60% of my publications are fully independent of former supervisors, and by securing more than €650,000 as Principal Investigator or unit leader, including a Marie Skłodowska-Curie Global Fellowship, national Antarctic grants, and two EU Transnational Access awards. My scientific leadership is recognized through invitations as Keynote Speaker, editorial roles in multiple international journals, and evaluator positions for national and international funding agencies.

My research program aims to uncover the limits of microbial habitability and resilience under global environmental change. It is structured around four integrated axes:

1. Microbial thresholds of habitability in global drylands, combining global field campaigns, multi-omics, high-resolution environmental monitoring and AI-assisted ecological forecasting to generate the first functional early-warning indicators of soil degradation and desertification.
2. Rock-hosted microbiomes as planetary analogues, positioning Spain as the central hub of ROCKFUN and delivering mechanistic models of community stability under intensified warming and desiccation.
3. Extreme fungi as models for stress adaptation and emerging pathogenicity, integrating comparative genomics, experimental evolution under UV, thermal and desiccation gradients, and AI-based predictions to identify evolutionary links between extremophily and virulence.
4. Advancing eukaryotic environmental genomics, expanding aweMAGs, the first automated workflow for recovering and annotating eukaryotic MAGs, incorporating long-read sequencing, pangenomics and machine-learning classifiers.

This research program will consolidate Spain as an international reference in microbial ecology of extreme environments, desertification science and planetary habitability, delivering predictive tools, open-access resources and fundamental knowledge to support climate-change adaptation.

Resumen del Currículum Vitae:

I am an environmental microbiologist with a strong international career focused on microbial ecology, extreme-environment biology and climate-change impacts on biodiversity. Since obtaining my PhD in 2018, I have published over 80 peer-reviewed papers, around half as first, corresponding or senior author in leading Q1 journals. My research has received wide recognition (H-index: 25, citations:1800) and produced high-visibility outputs, including global open-access datasets, invited reviews and conceptual contributions on microbial adaptation, extremophile ecology and desertification processes.

My scientific trajectory is deeply international. I have held competitive research appointments in Italy, the United States, Spain, Austria and Australia, including a Marie Skłodowska-Curie Global Fellowship (2022-2025) with research periods at UC Riverside (USA) and CSIC-IRNAS (Spain). I have also been a visiting researcher at Western Sydney University, the University of New South Wales, the Forestry and Agricultural Biotechnology Institute (South Africa), BOKU (Austria), and Fondazione Edmund Mach (Italy). I have secured more than €650,000 as PI or co-PI across national Antarctic programs (PNRA), EU Transnational Access grants. I am the founder and coordinator of ROCKFUN, the first global consortium for rock-inhabiting microbial communities, uniting more than 50 research groups and establishing shared multi-omics and sampling protocols worldwide.

I have delivered more than 50 conference contributions, including keynote and invited talks at major international meetings such as the International Conference on Polar and Alpine Microbiology (PAM 2026), the International Mycological Congress (2024) and the International Congress of Genetics (2023). I have organized and chaired scientific symposia and I have also been invited to give seminars at NASA Jet Propulsion Laboratory, Western Sydney University, UNSW, and major research institutes in Europe and South Africa.

My academic service includes editorial positions in BMC Genomics, BMC Microbiology, PLoS One, Life, Forests and the Journal of Sustainable Agriculture and Environment, and previous roles with Plant and Soil and Methods in Ecology and Evolution. I have reviewed more than 70 manuscripts for high-impact journals and contributed to research evaluation for France 2030, the National Science Center of Poland, the IPCC Sixth Assessment Report, and the British Ecological Society. I also evaluate PhD theses and Elsevier book proposals.

I have mentored early-career researchers by supervising four PhD students, one postdoctoral researcher, and more than 15 MSc and BSc students, supporting their publications, project participation and international mobility. Several of them have obtained competitive PhD, postdoctoral or research positions. Beyond research, I contribute to higher education as Lecturer in Applied Botany to Cultural Heritage and Teaching Assistant in Mycology and Molecular Phylogeny.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Currently, I serve as Alternate Vice-Chair of the FAO Global Soil Partnership NETSOB (Working Group 3), contributing to global soil-biodiversity policy and monitoring standards. My scientific leadership, international engagement and consistent research output position me as an independent and globally recognized expert in microbial ecology, extreme environments and climate-change biology.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MANSOR, MUAMMAR
Referencia: RYC2025-054375-I
Correo Electrónico: muammar10@gmail.com
Título: Microbial-mineral interactions: novel light-dependent metabolisms, climate change, and materials of the future.

Resumen de la Memoria:

Dr. Muammar Mansor is an interdisciplinary expert in microbiology, geosciences and geochemistry, specializing in microbial-mineral interactions that affect the biogeochemical cycling of key elements with implications to biosignatures, pollutant remediation and nutrient availability. He obtained his BSc, MSc and PhD followed by a postdoc in the USA, before moving to the University of Tuebingen (Germany) in 2020 where he has established himself as a group leader in Geomicrobiology. His publication record is stellar with 38 scientific articles (20 as corresponding authors) covering topics in microbial-mineral interactions, environmental nanoscience, metal(loid) contaminants, early Earth biogeochemistry and astrobiology, highlighting his expertise in various Earth science disciplines. His key publication – a review article in 2025 – cements his status as a leader especially in the field of biomineralization of metal sulfides. He has continued developing 3D imaging high resolution techniques based on electron and synchrotron-based microscopy to investigate microbe-mineral interactions at the nanoscale. He has mentored several researchers (2 postdocs, 4 PhD students and several BSc and MSc students), developed new engaging teaching materials, and regularly participates in creative outreach and science communication programs. In addition, he regularly organizes international workshops and scientific sessions at international conferences. He is currently an associate editor for the new scientific community journal Geo-Bio Interfaces. Recently, he has been active in developing international cooperation with a focus on underrepresented regions such as Peru and Malaysia as a step toward a more inclusive and globally connected environmental science.

His mobility and internationalisation are underscored by his time in the USA (10 years) and Germany (5 years). He has successfully established his own research group through active acquisition of third-party fundings totaling 1.1 million Euro. Postdocs and PhD students that left his group have either obtained a postdoctoral position, fixed research jobs or a professorship. Other PhD students are expected to defend in 2026. The successful completion of these grants highlights his proficiency in designing and managing large research projects.

His future research is centered on the concept of “Microbial-mineral interactions: novel light-dependent metabolisms, climate change, and materials of the future.” In Key Project 1 (KP1), he will uncover novel light-dependent metabolisms beyond oxygenic photosynthesis, specifically focusing on two ecologically-important microbial groups (cyanobacteria and sulfate reducing bacteria). In KP2, he will investigate the emerging threat of acid rock drainage to water resources due to climate-induced permafrost thaw in Alpine regions. In KP3, he aims to optimize synthesis methods of biogenic pyrite for the development of sustainable photovoltaics of the future. These KPs are designed as initial exploratory ideas, before narrowing down the scope in phase 2 of the project. This ambitious proposal adds valuable components of light-dependent interactions, climate change and technological applications to complement his existing expertise in microbial-mineral interactions.

Resumen del Currículum Vitae:

Dr. Muammar Mansor obtained the Bachelor and Master in Biotechnology (2009-2012), followed by the dual-title PhD program in Geosciences & Astrobiology (2013-2017) at the Pennsylvania State University (USA). His thesis, funded by the NASA Astrobiology Institute, was focused on the application of biominerals as biosignatures to detect traces of microbial life. His interdisciplinary approaches included genomics, culturing, stable isotope analysis, electron microscopy and reactive transport modeling to characterize microbial biominerals from the micro-scale to the field scale. His PhD resulted in 5 publications with 4 of them as first authors.

As a postdoc (2017-2019), he specialized in environmental nanoscience at the University of Texas at El Paso (USA). His work – based on extensive transmission electron microscopy (TEM) – allows for the prediction on the fate and behavior of metals in various natural and engineered environments, especially for pollutant bioremediation and resource recovery of precious metals by sulfate reducing bacteria. He then led a collaborative effort to develop single-particle ICP-MS to quantify the dissolution behavior of metal sulfide nanominerals in suspension on a particle-by-particle basis. His postdoc resulted in 4 published articles and 1 review paper, all as first authors.

From 2020, Dr. Muammar Mansor has been a Research Group Leader in Geomicrobiology at the University of Tuebingen (Germany). In this position, he is integrated in the head professor’s research group while receiving training equivalent to an assistant professor. He develops his own research group, write proposals, obtain funding, teach, supervise and perform administrative tasks for the Geomicrobiology group (with ca. 25-30 group members). He has published 25 articles (10 as corresponding authors), obtained third-party funding totaling ~1.1 M Euro, organized two international workshops and established worldwide collaborations (e.g., Peru, Malaysia, USA, UK, France).

His research group has consisted of 4 PhD students and 2 postdocs, plus many more BSc and MSc thesis students. Their projects are united with a central focus on biotransformation of metal(loid)s as nutrients and pollutants. He teaches Environmental Nanoscience (MSc), Geomicrobiology and Environmental Microbiology (MSc), Geomicrobiology (BSc), and Geomicrobiology Lab Course (MSc). Members that have left his group (both postdocs and 1 PhD student) have secured either postdoctoral positions or fixed jobs in research institutes.

To develop the scientific community, Dr. Muammar Mansor regularly organizes sessions at international conferences such as the Astrobiology Science Conference (AbSciCon), American Chemical Society (ACS) and Goldschmidt. He also hosts international workshop/meetings such as the Tools in Biogeochemistry Workshop, Biosignatures Workshop and Pyrite Network Meeting. His active LinkedIn account is home to posting of his latest researches. He is an active reviewer of project proposals such as the Humboldt Fellowship, DFG Individual Proposals and EUTOPIA SIF. His effort for



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

the community is recognized by him being offered the position of Associate Editor for the journal Geo-Bio Interfaces, which is a new journal focusing on researches in microbial-mineral interactions.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: LÓPEZ BAUCCELLS, ADRIÀ
Referencia: RYC2025-055290-I
Correo Electrónico: adria.baucells@gmail.com
Título: Integrative Mammal Ecology: Linking Technology, Ecosystem services and Conservation in human-modified environments

Resumen de la Memoria:

Since I started working on bat ecology and conservation, my overarching objective has been to advance the understanding of how biodiversity is shaped by human activities and to explore how technology can be leveraged to improve conservation actions in a rapidly changing world. My main research interests include the study of habitat connectivity, loss and fragmentation worldwide, all under the umbrella of applied ecology, with special emphasis on the use of bioacoustics, AI and IoT. I understand the "soundscape" as a path to promote sustainable land use and to protect severely threatened species, particularly when used through citizen science projects. In parallel, the assessment of the ecosystem services provided by bats represent one of my most important research areas, with the aim of efficiently connecting society with bat conservation, minimising human-wildlife conflict.

Impact of climate and land-use change on bats: A monitoring Citizen Science programme across the Mediterranean

As biodiversity is becoming increasingly threatened by global change, measuring current trends of wildlife populations are urgently needed. Monitoring programmes based on citizen science have become a central part of conservation, as they allow the collection of a wealth of data covering large spatial and temporal scales. Through the implementation of a monitoring programmes based on citizen science, I am gathering high-quality data to assess the most pressing threats. By participating in the UNEP Eurobats agreement, I can help to standardise monitoring methods and harmonise data collection across regions. My final aim is to lay the groundwork for the first unified Monitoring Programme across the Mediterranean.

Developing technology for conservation

Bioacoustics has become one of the primary methods for monitoring bats. My interest in technology for conservation has been boosted by recent technological advances. With a wide variety of collaborators, I am working to develop some emerging methodologies. With Dr Aaron Corcoran (Colorado University), we are developing a YOLO-based AI system to analyse nocturnal IR videos. Dr Xavier Jordà (CNM) is helping us to build ultrasound lures, and with Dr Edward Hurme (Max Planck Institute), we are studying migratory bats using SIGFOX tech. We are also installing a dataloggers' network in caves to monitor climate change in the underground with Dr Rui Seabra. There is a long road ahead with multiple opportunities to link technology and ecology, fostering conservation.

Ecosystem services and integrated pest management

Controlling insect pests has been a significant challenge in agriculture worldwide. Integrated Pest Management practices are respectful and cost-effective ways to overcome this problem. Bats are well known as arthropod predators worldwide. Since the 2010s, I have been assessing the state of knowledge about bats' role as pest controllers, synthesising the evidence of this process (in Spain, Madagascar and Mexico). I aim to define and promote good practices grounded in conservation evidence, primarily through before-after-control experiments, bioacoustics and genetics, but integrated in an anthropological framework, as neither dimension can be fully understood without the other.

Resumen del Currículum Vitae:

I am currently a postdoc researcher at the Natural Sciences Museum of Granollers, a research institute in Spain. I started working on bat ecology in 2010 at the University of Barcelona, with a BSc project on bat bioacoustics in Colombia, a MSc on ecological interactions amongst flying foxes in Australia and a PhD on bats and forest fragmentation in Brazil. I defended my PhD in 2019 (University of Lisbon), with distinction and honours. During my career, I have contributed over 100 publications to journals such as Biological Reviews, Nature Communications and Science of the Total Environment.

I contributed to understanding bioacoustics as an effective method for assessing the impacts of forest fragmentation on bats. I worked with AI to improve computer pipelines to analyse big data. I expanded my research to Africa with side-projects in Kenya and Madagascar (2012-2016), in America, with a project in French Guiana (2019) and México, and in Asia, with trips in Malaysia (2018) and Taiwan (2024). I contributed to the creation of the Global South Bats initiative, led by Dr Medellín by teaching at two workshops (Kenya 2020; Costa Rica 2023).

Knowledge transfer to stakeholders represents a critical pillar of my trajectory. Since 2012, I have worked as editor-in-chief of the Journal of Bat Research & Conservation. I also received a photo-project grant to document bat-human relationship in Madagascar (WWF-Montphoto). In fact, some of my scientific works and photography have been published in the most prestigious magazines (e.g. BBC Wildlife, BBC Earth and Mongabay) as well as National Geographic, with whom I also contributed to a short video documentary.

Since 2018, I have been involved as a working group coordinator at the United Nations Environment Programme, as the Eurobats Spanish scientific focal point. I have recently participated in a Plan Nacional project (Spanish Ministry of Research, Innovation and Universities) on sustainable agriculture and biological control (PID2019-105670GB-I00) and invited to join a European COST Action project as a working group leader. My interest in bat



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

monitoring and the use of technology for conservation led me to take the scientific coordination of a citizen science monitoring programme in Catalonia.

In 2019, I started supervising students, totalling 8 PhD theses and >20 MSc and BSc students. As a very critical milestone for our research group, I led the team that organised and hosted the XVI EBRs conferences in 2024 (Tarragona), with >450 participants from 50 countries. In recent years, I secured funding, contributing to the projection and stability of the research team: a National Geographic Grant to study ecosystem services provided by bats in Madagascar (30.000€); a project by the Spanish Supercomputing Network to lead a team to improve our acoustic pipelines (~175.000€); and more recently, a 4-year project with Nestlé/Sustainable Agriculture Network for biodiversity monitoring in agriculture (~427.000€).

Now, securing a permanent position in the Spanish research system is critical to project our group internationally, and the Ramon y Cajal fellowship provides an ideal opportunity to achieve this goal.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: VIANA GONZÁLEZ, INÉS
Referencia: RYC2025-055140-I
Correo Electrónico: inesgviana@gmail.com
Título: Integrated understanding of coastal-ocean functioning and resilience

Resumen de la Memoria:

With the aim of disentangling how anthropogenic factors, mainly nutrient inputs and its interaction with other factors, affect functioning of marine ecosystems under global change scenarios, and the mechanisms influencing their resilience; my research career focuses on 3 key questions: (i), how does global-change factors shape ecosystems and which bioindicators effectively reflect these changes? (ii), how does stressors shape functional traits and how they mediate ecosystem functioning and service provisioning? and more recently (iii) what is the role of nutrient fluxes and land-sea connections in the resistance and resilience of coastal-ocean systems? My career has been directed by bringing up new questions that have led me to continuously broaden my expertise on marine systems.

Therefore, during my career, I have focused on the use and optimization of bioindicators both through observational and experimental approaches. I first critically addressed the use of nitrogen stable isotopes in macroalgae for tracking nitrogen sources, giving a novelty vision of the limitations for its quantitative use. During my postdoc, my interest in functional traits grew up not only for the response we get from the effects of environmental variables on organismal performance, but because they can also inform us about important aspects of ecosystem functioning and community responses to environmental change. However, in spite of the plethora of data on response variables, questions still remain as to the future of coastal habitats and to the impact on the ecosystem services that they provide. In other words, the link between the effect of global change and ecosystem functioning is still elusive. For all these reasons in my current position, I aim to answer some of these questions with a particular focus on blue carbon storage. These efforts allowed me to establish international collaborations, publishing highly cited articles, securing prestigious postdoctoral grants, participating in national and international projects and consortiums, and leading my own projects and research lines.

Resumen del Currículum Vitae:

I started in science when I finished my degree in Biology (University of Santiago de Compostela, 2002-2007; 2005-2006: University of Jyväskylä, Finland, ERASMUS Mobility Programme) by working at University of Santiago de Compostela (USC, 2008-2010). After this period, I was awarded with a FPI fellowship at Instituto Español de Oceanografía (IEO, 2010-2014). The conclusions of my PhD thesis (2015) led me to be awarded with the Doctorate Extraordinary Prize in Experimental Sciences (USC). During this time, I also gained two grants from MICINN (Spain) to perform 2 predoctoral research stays at Marine Biological Laboratory under the supervision of Dr. Valiela (2012 and 2013). I continued to develop my postdoctoral research career with competitively won grants: DAAD-Leibniz postdoctoral programme (Germany, 2015-2016), Xunta de Galicia postdoctoral programme (2016-2020), and Juan de la Cierva-Incorporación (2021-2023). These grants led me to increase my mobility in national and international institutions: Leibniz Centre for Tropical Marine Research (ZMT, Germany), CIIMAR (Porto, Portugal), University of Vigo (Spain), and IEO-CSIC (Spain). While also doing short-term research stays in order to complete the research projects and gain new technical skills at Institute of Marine Sciences (Zanzibar, Tanzania) and Deep Sea Arava Science Center (DSASC, Israel), and more recently at Tvärminne Zoological Station (TVS, Finland). As a whole, I have been working for 3 years and 5 months at international research institutions.

I successfully led the research lines associated with my postdoctoral grants apart from participating in 17 research projects or contracts, 3 as PI or CO-PI. The results of my research were published in 34 index articles (80% in Q1 journals), 3 book chapters and 6 open access datasets. Within articles, 20 were as first or last author, accumulating 621 citations (h-index:15, Scopus) from 481 documents. I sum up 102 co-authors, of which 70% are from international institutions. Our outcomes have been presented in 41 contributions to conferences, 28 of which were international. Importantly, I have a strong commitment with outreach activities, highlighting: Día de la Ciencia en la Calle (2024), Open Science Cambre and Festival Mar de Mares (2021, 2023), or Open Lab Days. I have also written pieces for scientific outreach. I have supervised 9 MSc theses, 6 BSc theses, and 7 internships. I have also supervised the research stay of a PhD student at Leibniz-ZMT (2017). At present, I co-supervise a MSc student and a PhD student. I am co-editor of a prospective book, entitled Stable Isotopes in marine food webs (Elsevier Inc.). I am Associate Editor in Frontiers in Plant Science and participated as Guest Editor in Special Issues in Frontiers in Plant Science and in Plants, and as reviewer in 27 prestigious journals (MPB, MEPS, NP or ECSS). I was chaired the Aquatic food webs session at the ASLO 2021 conference, and I was part of the organizing committee of the YOUNARES12 conference (2021) and the scientific committee of I Foro da Investigación Galega no Estranxeiro (FIGaE, 2024). I was also part of 2 PhD thesis committees and currently member of the Advisory Board of a PhD student. I am also part of the bank of experts of the Spanish Research Agency (AEI) and the European Commission.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: CARRENO LUENGO, HUGO
Referencia: RYC2025-055303-I
Correo Electrónico: hugo.carreno.luengo@gmail.com
Título: Spaceborne GNSS-Reflectometry for Earth Sciences: Methods, Applications, and Technology

Resumen de la Memoria:

In the framework of spaceborne Earth remote sensing, much of my research activities have been focused on experimental and theoretical studies of passive multi-bistatic radar techniques using L-band global navigation satellite systems (GNSS) signals as signals-of-opportunity. The use of Earth-reflected GNSS signals can improve many fields of Earth sciences, thanks to the ability of monitoring a wide variety of global essential climate variables (ECVs), with an unprecedented spatio-temporal sampling. Global measurements are needed to understand the effects of a changing climate on our planet.

Additionally, GNSS-R receivers are compact and require low power consumption, so they can be operated by SmallSats. SmallSats offer the possibility to improve the access to global datasets with high scientific value and thus changing the paradigm of traditional spaceborne missions. As such, my main motivation has been to further explore and develop the use of GNSS-Reflectometry techniques by SmallSats, so as to enable precise and accurate long-term monitoring of Earth surface dynamic processes. I pioneered such research line.

At Institut d'Estudis Espacials de Catalunya (IEEC), I was involved in the design of CubeSats for Earth remote sensing using GNSS-R. These research activities included the development of a GNSS-R instrument for spaceborne missions, such as the 3Cat-2 CubeSat and ESA's FSSCat SmallSats, generating in-orbit data of scientific value. At Jet Propulsion Laboratory (JPL), I was deeply involved in a JPL-funded GNSS-R experiment using the radar aboard NASA Soil Moisture Active Passive (SMAP). The experiment was successful and that set the basis for the development of a new SMAP operational mode.

My work at JPL has led me to NASA. Much of my current work at NASA Earth Science focuses on expanding the scope of scientific applications using the GNSS-R Earth remote sensing technique by the NASA Cyclone Global Navigation Satellite System (CYGNSS). I was a key-investigator for the extension of the CYGNSS mission scope ~ \$62 million for land applications, through direct, daily nature, interactions with Prof. Ruf, contributing to the NASA senior reviews. My strong contribution to the strategic vision complements my operational tasks at the CYGNSS Science Operations Center (SOC). I consider myself and expert on GNSS-R for land. I have developed a new GNSS-R data product, which improves the CYGNSS spatial resolution by a factor of ~ 100. I have developed the CYGNSS coherent end-to-end simulator to support the development of wetland extent retrieval algorithms over heterogenous scenes. I have demonstrated the ability of CYGNSS to resolve dynamic wetland surface extent under dense vegetation up to ~ 400 ton/ha canopies by developing new L1 retrieval algorithms.

More recently, my active research focus is on the long-term mapping of soil surface freeze/thaw (F/T) state with improved spatio-temporal sampling by GNSS-R, comparing favourably to other existing cryosphere F/T products, such as those produced by synthetic aperture radar (SAR) and microwave radiometry. Currently, I am the PI of the NASA Research Opportunities in Space and Earth (ROSES) Freeze/Thaw Wildfires Risk Prediction (FIRE) project ~ 500 k\$, attracting additional top-level researches to the CYGNSS Science Team, further strengthen our scientific capabilities.

Resumen del Currículum Vitae:

I received the Ingeniero Aeronáutico degree (Plan de Estudios 2000, @BSc+MSc@), specialization in Spacecrafts, from the Escuela Técnica Superior de Ingenieros Aeronáuticos (ETSIA), the Universidad Politécnica de Madrid (UPM), Madrid, Spain, in 2010, and the PhD degree (cum laude) from the Department of Signal Theory and Communications (TSC), the Universitat Politècnica de Catalunya (UPC), Barcelona, Spain, in 2016.

I was a Postdoc Fellow at the NASA Jet Propulsion Laboratory (JPL) - CalTech. Later, I joined the NASA Cyclone Global Navigation Satellite System (CYGNSS) Science Team, first as a Postdoc Fellow, and later as an Assistant Research Scientist, working directly, i.e., door-to-door, with the Principal Investigator (PI) of CYGNSS at the University of Michigan (U-of-M), under a contract with the NASA Science Mission Directorate, overseeing a total budget of ~ \$212 million. In 2024, I was promoted to Associate Research Scientist, and I am currently the PI of the NASA Research Opportunities in Space and Earth Science (ROSES) Freeze/thaw wildfires Risk prEdiction (FIRE) project ~ 500 k\$. My research interests include GNSS-Reflectometry methods, applications, and technology.

I was the recipient of the U-of-M Research Faculty Recognition Award by the Office of the Vice-Provost for Research in 2024. I am a member of the American Geophysical Union (AGU). I serve on the Editorial Board of MDPI Remote Sensing, and I am an Associate Editor of IEEE Transactions on Geoscience and Remote Sensing.

Highlights: Participation in 14 international research projects (NASA, ESA, EU-FP7, etc). Key-investigator for the extension of the NASA CYGNSS mission scope ~ \$62 million. PI of the NASA ROSES FIRE project ~ 500 k\$. 58 indexed -peer-reviewed- articles (~ 82 % first + corresponding author); out of which 30 are articles without my PhD supervisor and 48 are articles with international co-authors. 1 book (editor) + 1 book chapter (single author) + 1 IEEE standard (Chair + first author) + 1 PODAAC data product (first + leading author). Citations: 1404; h index: 22; i10 index: 29. 17 national and international honours and awards. 74 (18 invited) presentations at international meetings (IGARSS, AGU, etc).

My research activity is impacting the society by developing new technologies, solving practical problems, and making informed decisions. With FIRE, I am reducing wildfire impacts on Arctic-boreal zone (ABZ) communities and ecosystems by adding remote sensing freeze/thaw (F/T) information to



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

improve guidance on application of the Canadian Forest Fire Danger Rating System (CFFDRS) Fire Weather Index (FWI) System. With the NASA Commercial SmallSat Data Acquisition (CSDA) Program, I am leveraging high-inclination orbit GNSS-R data by SmallSat constellations to explore the potential of commercial satellite data in advancing the agency's Earth science research and application objectives, e.g., the short revisit time by GNSS-R missions enables next-generation flood early warnings. With the NASA Land-Cover and Land-Use Change (LCLUC) program, I contributed to document the status and rate of change of how land cover and land use and how trajectories of these changes are linked to population and demographic transitions in Vietnam. Additionally, I am collaborating with NewSpace companies by exploiting new remote sensing data in a win-win situation.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: FONT VIVANCO, DAVID
Referencia: RYC2025-055713-I
Correo Electrónico: dfontv@gmail.com
Título: Efectos Rebote en las Transiciones hacia la Sostenibilidad Agroalimentaria

Resumen de la Memoria:

Mi trayectoria investigadora se centra en comprender y modelizar cómo las interacciones entre comportamiento, tecnología y estructura económica generan efectos rebote y otras consecuencias ambientales y sociales no intencionadas. Este enfoque interdisciplinar integra análisis de ciclo de vida, modelos input-output multirregionales, econometría y modelización macroeconómica, con el objetivo de mejorar la evaluación y el diseño de políticas de sostenibilidad. Durante mi doctorado en la Universidad de Leiden desarrollé el primer marco teórico formal del Efecto Rebote Ambiental, hoy utilizado en evaluaciones de ciclo de vida y modelos macroeconómicos. Esta contribución constituye la base de una línea de investigación independiente que he ampliado mediante innovación metodológica y colaboraciones internacionales.

He desarrollado métodos híbridos que combinan ACV, IOA, análisis conductual y modelización económica para cuantificar respuestas inducidas por políticas ambientales, así como métricas de red para estudiar interdependencias globales de recursos. Mis trabajos han aportado evidencia empírica de efectos rebote en economía circular, sistemas de reutilización y comportamientos de consumo. Estas contribuciones se han publicado en revistas como Environmental Science & Technology, Applied Energy, Journal of Cleaner Production, Energy Policy y Journal of Industrial Ecology, y han recibido reconocimientos internacionales, entre ellos dos Graedel Prizes y el premio CML. Muchas de estas metodologías tienen aplicación directa en sistemas agroalimentarios, especialmente en la evaluación de intervenciones relacionadas con desperdicio alimentario, dietas, reutilización y cambios en patrones de consumo.

El proyecto RyC se apoya en esta base metodológica para abordar una cuestión crítica aún no resuelta: cómo medir y anticipar los efectos rebote conductuales, distributivos, empresariales y macroeconómicos generados por políticas agroalimentarias y estrategias de economía circular. La propuesta desarrollará el primer marco integrado multiescala para evaluar impactos intencionados y no intencionados en sistemas alimentarios, combinando experimentación conductual, ACV, análisis input-output, distribución del gasto y modelización económica. Este marco permitirá detectar efectos de compensación hoy invisibles y generará indicadores y herramientas que facilitarán la toma de decisiones basada en evidencia. Asimismo, contribuirá a alinear políticas agroalimentarias con los objetivos del Green Deal, la Estrategia "Farm to Fork" y las prioridades nacionales de transición justa.

Mi incorporación a CREDA permitirá consolidar una línea especializada en modelización híbrida de sistemas alimentarios, complementando su experiencia en economía agraria, políticas alimentarias y comportamiento del consumidor. El proyecto fortalecerá la capacidad del centro y del sistema español de ciencia para anticipar impactos ambientales y socioeconómicos de las transiciones agroalimentarias, proporcionando conocimiento clave para políticas justas, eficaces y alineadas con los objetivos europeos. Además, sentará las bases de una agenda de investigación competitiva a largo plazo, orientada a la captación de talento, la generación de herramientas abiertas y el liderazgo internacional en el análisis de efectos rebote en sistemas agroalimentarios.

Resumen del Currículum Vitae:

Mi trayectoria profesional combina investigación de excelencia, liderazgo científico, experiencia internacional y una sólida capacidad de transferencia. Soy doctor en Ecología Industrial por la Universidad de Leiden, centro de referencia mundial en análisis ambiental, y he desarrollado mi carrera en instituciones internacionales como Yale University y University College London. Esta formación me ha permitido adquirir competencias avanzadas en modelización ambiental-económica, integración de datos y coordinación de equipos multidisciplinares, consolidando un perfil autónomo y de proyección internacional.

Mi producción científica incluye 34 artículos revisados por pares, 17 de ellos como primer autor, publicados en las principales revistas de sostenibilidad, energía y análisis ambiental. Mi impacto académico cuenta con un índice h de 23 (Scopus) y más de 1.900 citas. He recibido reconocimientos internacionales como dos Graedel Prizes, el premio CML y una nominación al C.J. Kokprijs a "Discoverer of the Year", reflejo de la originalidad y relevancia metodológica de mis aportaciones. También he actuado como editor invitado y revisor habitual de más de veinte revistas de alto impacto, contribuyendo activamente a la gobernanza científica del área.

He liderado más de 500.000 € como investigador principal en proyectos competitivos, entre ellos los europeos PRECIOUS (Horizon Europe), EFFECT (MSCA-IF) y RETHINKWASTE (LIFE). Durante mi etapa en consultoría también ejercí como IP, manteniendo actividad investigadora y publicando de forma continuada. Mi experiencia profesional incluye la dirección de unidades de modelización, la entrega de herramientas de evaluación ambiental y económica para administraciones públicas y empresas, y la participación en iniciativas internacionales de datos y metodologías abiertas. He contribuido al desarrollo de bases de datos, indicadores y modelos utilizados por instituciones públicas, organismos internacionales y entidades privadas, ampliando el alcance aplicado de mi trabajo.

En el ámbito académico he supervisado dos tesis doctorales y un trabajo de máster, y he impartido docencia en Leiden University, UCL, Yale University y la International Life Cycle Academy. Soy Fellow de la Higher Education Academy del Reino Unido y participo activamente en el servicio científico mediante labores editoriales, revisión de artículos, organización de sesiones en congresos internacionales y participación en comités científicos. Mi liderazgo se refleja también en la presidencia de la sección de Life Cycle Sustainability Assessment de la International Society for Industrial Ecology, así como en colaboraciones con más de 80 coautores de Europa, América, África y Asia, que evidencian una amplia red internacional.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Mi perfil integra investigación puntera, liderazgo en proyectos europeos, docencia internacional, transferencia al sector público y privado y un compromiso firme con la ciencia abierta. Todo ello configura un currículum sólido, competitivo y plenamente preparado para impulsar una agenda de alto impacto dentro de CREDA y del sistema español de I+D, contribuyendo de manera directa al fortalecimiento de capacidades nacionales en sostenibilidad y transición ecológica.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: ARRANZ URGELL, IGNASI

Referencia: RYC2025-055146-I

Correo Electrónico: ignasiarranz@gmail.com

Título: Freshwater Ecology under Global Change

Resumen de la Memoria:

From a master's student to a postdoctoral researcher, my career path has involved many working environments in European, North American, and Asian institutions, and I have gathered knowledge for the most renowned scientists of the field in limnology, biogeography, ecology, and evolution. My research is interdisciplinary covering a wide range of biogeographical, ecological, and evolutionary topics including body size, stable isotope analyses, species coexistence, and trophic cascades to gather a holistic understanding of biodiversity and ecosystem functioning in freshwaters. My research has contributed to generating new ideas in different fields of research including biogeography, trophic and community ecology, and limnology. All of my research has been conducted on the theme of biodiversity and ecosystem functioning of freshwater ecosystems under the influence of global change. I have participated in and coordinated research projects to investigate how biodiversity and ecosystems respond to the main factors of global change including eutrophication, landscape fragmentation, climate change, and biological invasions. I have worked in the trophic structure and dynamics of multiple freshwater systems including temporary ponds, streams and rivers, reservoirs, gravel pit lakes, and temperate and arctic lakes in European, South-American, and North-American continents. Although a large part of my research focuses on freshwater fish, I have no taxonomic bias and I have also worked with the whole ecosystem structure from unicellular organisms (e.g., phytoplankton, fungi) to vertebrates. In general, my research is divided into three main lines of investigation, each of which is linked to each other at different spatial (local to continental), temporal (seasonal to decades), and biological (individual to ecosystem) scales: (1) experimental quantification of the mechanistic links of global change (2) field-based assessments of community and food web structure and stability and (3) global patterns to understand how biodiversity is shaped at the globe. I embraced open science principles, reproducibility, and transparency in academia as I have prepared the scholarly outputs in public repositories. I aim to consolidate my quantitative and freshwater ecology research lines in Spain as an international hub for innovative, collaborative and data-driven ecological research.

Resumen del Currículum Vitae:

I successfully defended my PhD thesis in 2017, obtaining the maximum qualification for my PhD thesis: cum laude and international recognition. This deserves more credit given that I was the first PhD student for my PhD supervisors and the first promotion of PhD studies within the doctoral program of Experimental Sciences and Technology at the UVic-UCC. I have progressively transitioned from project-based positions in international institutions (Canada and France) to leading my own research projects in Spain, reflecting a steady growth in scientific independence and leadership. As such, I have recently been distinguished as a recognized researcher (R3 certificate) by the Agencia Estatal de Investigación of the Ministerio de Ciencia, Innovación y Universidades acknowledging my research independence and leadership. In my postdoctoral stage between 2017 and 2024, I conducted four postdocs in international (Concordia University, Canada; and University Paul Sabatier, France) and national (UVic- UCC, King Juan Carlos University) research institutions. I am currently the principal investigator of two projects: FRESCO, a five-year research program with the Programa de Ayuda de Atracción del Talento 2022 from Comunidad de Madrid and, WARMSIZE: Understanding warming-induced effects on body size scaling relationships in planktonic food webs from Agencia Estatal de Investigación 2023. I was also the coordinator and principal investigator of another project (ACROSS funded by the Iberian Society of Ecology) to study macroecological patterns of biodiversity and trophic food webs in ecological systems. I conceptualized and led the main analyses of my scientific contributions and a proof of this is that I am the first, second or last author of most of my publications (∼85 %). I always pursue cutting-edge research and one proof of that is that a great part of my research (∼75 % of my publications) has been published in high-impact journals (first and second quartiles). I am currently mentoring two postdoctoral researchers: Dr. Guillermo García-Gómez (2024-present), and Dr. Melina Celeste Crettaz (2025-present). I supervised the PhD thesis of Dr. Rosa Gurí at the UVic-UCC (cum laude, July 2025); and I am currently supervising Ariadna García-Astillero at the URJC. I have also supervised final projects for four master's and six undergraduate (two ongoing) students. I have reviewed 47 manuscripts in 31 scientific journals such as Nature Ecology and Evolution or Journal of Animal Ecology. I have been granted with four travel fellowships to assist in national and international conferences, and I was awarded with four fellowships to support my research during the PhD thesis. In teaching, I have accumulated a total sum of 513 hours across theoretical (56h) and practical (457h) courses at both undergraduate and postgraduate levels. I was a member of three tribunals in Final Degree Projects of Biology at the UVic-UCC, and I have also been an evaluator of projects for national (Parques Nacionales 2025 call) and international agencies (National Science Centre of Polish). I have participated in numerous activities to promote science communication including Bioblitz (Toulouse), BIOcommuniCAT (Vic), European Research Nights (Barcelona), or Osona Technology market (Vic).



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GRINYÓ ANDREU, JORDI
Referencia: RYC2025-055359-I
Correo Electrónico: jordigrinyo85@gmail.com
Título: Exploring Vulnerable Marine Ecosystems: Biodiversity, Dynamics, and Restoration Strategies in Continental Shelf and Slope Environments

Resumen de la Memoria:

My research investigates the ecology, dynamics, and restoration of Vulnerable Marine Ecosystems (VMEs) in mesophotic and deep sea environments. I combine underwater robotics such as ROVs, AUVs, and landers, long term observatories, 3D photogrammetry, deep learning image annotation, aquaria based experiments, and advanced ecological modelling to assess megabenthic biodiversity, community structure, ecosystem functioning, and recovery trajectories. This interdisciplinary approach has informed conservation planning, marine protected area design, and large scale restoration initiatives in the Western Mediterranean.

I have established a coherent and independent scientific trajectory supported by competitive fellowships, including a Marie Skłodowska Curie European Fellowship and a Beatriu de Pinós Fellowship, following postdoctoral positions at Sorbonne Université and the Royal Netherlands Institute for Sea Research, NIOZ. At ICM CSIC, I currently serve as Co PI of LIFE Ecorest, €3.6M, PI of two LIFE Ecorest50 projects, Work Package Leader in the Horizon Europe REDRESS project, and PI of the €1.6M Mar de Gorgonias contract with Red Eléctrica de España, the first large scale reef restoration program associated with submarine cable infrastructure in Spain. In total, I have secured over €5.2M as PI or Co PI.

My scientific production includes 51 peer reviewed articles, 51 percent in major responsibility authorship positions, 18 book chapters, more than 1,600 citations, and an h index of 24. I have participated in 13 research projects and 14 oceanographic campaigns, including three as lead scientist. I have delivered 42 conference presentations, 21 as first author, and have been invited to major international events such as the NW Mediterranean Deep Reef Seminar, the Marine Biogeographical Seminar, 2024, and the Third Meeting of the Special Group under the Marine Action Plan, DG MARE, Brussels 2025, where I presented the restoration outcomes of LIFE Ecorest. The policy relevance of this project was underscored by the visit of the European Commissioner for Fisheries and Oceans.

I actively transfer scientific knowledge to fisheries associations, public agencies, and industry partners, contributing to the implementation of the EU Nature Restoration Regulation and Spain's National Restoration Plan. I have developed outreach tools, including comics, board games, and a gymkhana activity, leading to three patents and broad public engagement in marine ecology.

I have co supervised four PhD theses, one completed Cum Laude and three ongoing, and eleven Master's theses, and I have taught at the University of Barcelona, Sorbonne Université, Utrecht University, and Università Politecnica delle Marche. I coordinated the 2025 Ramon Margalef Colloquia and an international workshop. My academic service includes reviewing for 14 journals, acting as Review Editor for Frontiers in Marine Science, Editorial Board Member of Marine Biodiversity, Impacts, and Conservation, and evaluator for proposals from the Red de Parques Nacionales and the Schmidt Ocean Institute. These achievements reflect a solid, independent, and impactful trajectory in VME ecology and restoration.

Resumen del Currículum Vitae:

My research focuses on the ecology, functioning, and restoration of Vulnerable Marine Ecosystems in mesophotic and deep sea habitats. Through underwater imaging, using ROVs, AUVs, and landers, 3D photogrammetry, long term observatories, aquaria based experiments, and deep learning approaches, I study megabenthic biodiversity, ecosystem dynamics, and recovery processes to support evidence based conservation and restoration. I am currently a Beatriu de Pinós Postdoctoral Fellow at ICM CSIC. My previous positions include a Marie Skłodowska Curie European Fellowship at NIOZ and a postdoctoral stay at Sorbonne Université. I have secured more than €5.2M as PI or Co PI, including Co PI of LIFE Ecorest, €3.6M, PI of two LIFE Ecorest50 projects, Work Package Leader in the Horizon Europe REDRESS project, and PI of the €1.6M Mar de Gorgonias program with Red Eléctrica de España. These initiatives place my work at the interface of science, policy, and marine management, contributing to the implementation of the EU Nature Restoration Regulation and Spain's National Restoration Plan.

My scientific output includes 51 peer reviewed publications, 51 percent in major responsibility authorship positions, 18 book chapters, more than 1,600 citations, and an h index of 24. I have participated in 13 research projects and 13 oceanographic cruises, two as lead scientist, and presented 42 conference communications, including 21 as first author. I have been invited speaker at the NW Mediterranean Deep Reef Seminar, the Marine Biogeographical Seminar, 2024, and the Third Meeting of the Special Group under the Marine Action Plan, DG MARE, Brussels 2025.

I have developed restoration protocols for habitat forming species and produced outreach materials such as comics, board games, and a gymkhana activity, resulting in three registered patents. My work includes sustained collaboration with fisheries associations and public agencies and active involvement in restoration planning and knowledge transfer.

I have supervised four PhD theses, one Cum Laude and three ongoing, and eleven Master's theses, and taught at the University of Barcelona, Sorbonne Université, Utrecht University, and Università Politecnica delle Marche. I coordinated the 2025 Ramon Margalef Colloquia. My academic service includes reviewing for 14 journals, serving as Review Editor for Frontiers in Marine Science, Editorial Board Member of Marine Biodiversity, Impacts, and Conservation, and evaluator for the Red de Parques Nacionales and the Schmidt Ocean Institute. These activities reflect a consolidated international profile and leadership capacity.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: THAYSEN, EIKE
Referencia: RYC2025-055270-I
Correo Electrónico: eike.thaysen@idaea.csic.es
Título: Underground microbial, geochemical and geophysical processes in porous media
Resumen de la Memoria:

Eike Thaysen (ET) graduated as a PhD in biogeochemistry and passive CO₂ sequestration from the Danish Technical University in December 2013. During her PhD, ET had two external stays of 1-2 months at the Belgian Nuclear Research Centre where she collaborated around the creation of a model for soil CO₂ production.

ET's first post doc position was at the Danish Technical University (2013- 2014), on the Danish project CLIMAITE (climate change in terrestrial ecosystems) where she investigated soil carbon cycling in a future climate and learned important laboratory techniques (e.g. carbon isotope analysis). In 2014 ET took on a position at the National Spanish Research Council (CSIC), on the Spanish project RESEC (Reactividad de las rocas almacén y sello en el secuestro geológico de CO₂). Here she carried out high-pressure and temperature experimental and modelling studies on the effect of SO₂ impurities in the CO₂ injection stream on the reactivity with reservoir rocks. ET collaborated with Ghent University (Belgium) around the visualization of porous media geochemical processes with x-ray microcomputed tomography.

In 2017 ET worked 6 months for the environmental consultancy company AMPHOS21, Spain. Her main task was the modelling (PHREEQC) of the leaching of rare earth elements from nuclear waste in cement encapsulations.

ET's third postdoc was at the University of Edinburgh in the UK where she worked during 2 years and 9 months on the EPSRC-funded project HYSTORPOR (Hydrogen Storage in Porous Media) and later on the EU project HYUSPRE (Hydrogen Storage in Porous Reservoirs). At Edinburgh University, she was responsible for investigating biological and physical aspects of H₂ storage in rocks using methods that ranged from x-ray imaging of H₂ fluid flow in high-pressure experiments to desk-based analysis. ET's time at the University of Edinburgh was characterized by great scientific impact and many fruitful international collaborations including with Stansted University (USA), Harriot-Watt University (UK) and Clausthal University of Technology (Germany).

Since autumn 2022 ET has been employed as a researcher and project manager at CSIC on the EU project UPWATER (Understanding groundwater Pollution to Protect and enhance WATER quality). On the research side she is in charge of the groundwater monitoring, using novel and economic passive samplers, developed in the national projects VAMOS (Validación del uso de muestreadores pasivos cerámicos en aguas subterráneas) and CPS-GW (Development and deployment of new ceramic passive samplers for the monitoring of contaminants in groundwater). Since 2025 ET has also worked to simulate the biogeochemical impact of cyanobacteria, as a part of the EU/INTERREG-SUDOE project CYAN-EAU (Sistemas innovadores de control de la proliferación de cianobacterias en las masas de agua de Sudoe). In 2024, ET gained £160.234 funding to be the Principal Investigator on the national project SHIELD (Sustainable Hydrogeological Initiatives to Enhance Groundwater Status and its Long-term Development) which develops preventive measures to reservoir contamination in collaboration with stakeholders. Meanwhile ET continues to pursue her H₂ research and she has been funded to develop diagnostic tools and risks protocols for UHS on the EU-project HYDRA where ET is a WP leader (WP budget: €250.000, total budget: €3.016.110).

Resumen del Currículum Vitae:

Eike Thaysen (ET) is a skilled biogeochemist, with 9 years of highly international and multidisciplinary work experience. Her research focuses on the microbial, geochemical and physical processes that are relevant to underground porous media, in particular in relation to underground storage of hydrogen, H₂, and carbon dioxide, CO₂, and to groundwater quality.

Among the achievements that ET is most known for is the development of a novel H₂ storage site selection tool and microbial risk register based on the growth criteria of H₂ consuming microbes, which is being applied by industry partners worldwide. In addition, she developed a new biogeochemical modelling tool for simulating microbial H₂ consumption. Also, testing over 200 different reservoir rocks and three cement types, ET proved that H₂ is virtually unreactive in an abiotic environment.

Carrying out synchrotron x-ray computed microtomography experiments on H₂ flow through rock, ET demonstrated that underground H₂ storage in porous media is economically feasible, as 30-80% of the injected H₂ can be recovered. Her most recent work reveals Haines jumps that challenge current reservoir models. These findings are of uttermost relevance to scientists, industry and policymakers. Consequently, her work has led to 3 policy citations and five knowledge-transfer projects with industry, 3 of which as a principal investigator, in total summing £37.958 of individual income and £130.730 of total project income. It also led to 4 news articles and 1 radio interview. During her time at Edinburgh University (2020-2022), ET co-supervised 14 MSc thesis and taught on the Environmental Geochemistry course. In 2022, ET was awarded the Higher Education Academy Associate Fellowship for her teaching efforts.

Since October 2022 ET has been employed at CSIC as a researcher and project manager on the EU-project UPWATER where she is working to improve groundwater quality and has supervised 2 MSc students and 2 PhD students (on-going). So far, her roles have led to 23 different outreach actions related to groundwater contamination and ways to improve groundwater quality. In 2024, ET gained funding to support UPWATER activities with the national project SHIELD (Role: principal investigator, Budget: €160.234) and to further mature UHS with the EU-project HYDRA (Role: work package leader, Total Budget: €3.016.110,22, Work Package Budget: €250.000).

ET has produced a high impact on the research community. In total, she published 20 articles in JCR journals, 18 of which are in Q1 journals (5 in decile D1), 4 of these with impact factors of 16 or higher. In the 9 years since her PhD, considering 3 years of maternity leave, she published 17 of these articles. ET is the first- and corresponding author of 55% of these publications, which shows her leadership and independence skills. Her research has attracted up to 2455 citations (Google Scholar), with an H-index of 14 (Researchgate). ET also authored 11 knowledge and technology-transfer reports, 1 white book and 19 public engagement articles. Her research has been presented at 30 conferences and webinars (AGU, EGU, etc.), of which 6 as



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

invited speaker. ET is an active reviewer for scientific Q1 journals and the Norwegian Research Council. ET has convened at 4 international conferences. Throughout her career ET initiated 9 international collaborations.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: DONNELLAN BARRACLOUGH, ALICIA MAY
Referencia: RYC2025-056687-I
Correo Electrónico: wilderseeds@gmail.com
Título: From Ecological Decline to Conservation Action: Developing Integrated Approaches to Halt Biodiversity Loss

Resumen de la Memoria:

I am a sustainability scientist specializing in social-ecological systems, land-use change, and biodiversity conservation, with a strong record of producing actionable knowledge through transdisciplinary research. I have published 20 high-impact papers (>65% as main author) in top journals such as Nature, PNAS, Global Environmental Change, People and Nature, Current Opinion in Environmental Sustainability, and Ecosystem Services. My work has received 544 citations (H-index 13) and has influenced both scholarship and international policy processes. I am Principal Investigator and coordinator of three major international projects (ACTIONABLE, BECOME, Peder Sæther), securing 2.5M€ and leading consortia across Europe, Africa, North and South America.

My research contributions span three core axes. First, I advance understanding of effective and equitable conservation in working landscapes, examining justice, participation, and governance across conservation areas. My studies have been influential in conservation equity research and demonstrated the potential of UNESCO Biosphere Reserves to contribute to the Global Biodiversity Framework.

The second axis focuses on transdisciplinary processes and social-ecological learning, developing frameworks to synthesize and transfer knowledge across diverse locations. I co-developed learning frameworks and led landmark syntheses on knowledge-action networks, including a People and Nature paper reviewing five decades of sustainability experimentation. As guest editor for Current Opinion in Environmental Sustainability, I curated 11 articles and authored an editorial on the role of networks in sustainability transformation.

The third axis centres on nature's multiple values and pluralistic nature valuation, advancing mixed-methods approaches to ecosystem services and land-use planning. I led influential work integrating social network analysis, participatory mapping, and surveys (cited >50 times). My supervision has produced novel contributions at the interface of ecosystem services, biocultural diversity, and environmental justice. Ongoing work under ACTIONABLE develops cutting-edge approaches for embedding plural valuation and justice in spatial planning.

My research is deeply embedded in science-policy engagement, with sustained collaboration with UN bodies (UNESCO, CBD, UNEP). I led two major UNESCO policy briefs that informed COP15 negotiations and Target 3 guidance, coordinated global consultations, and produced evidence syntheses for national governments. I frequently contribute to high-level events (e.g., IUCN 2021; CBD Geneva 2022; COP16 2024) and deliver keynote lectures to global research networks and intergovernmental organisations.

I have extensive leadership, building international partnerships across 13 countries, coordinating large research teams such as a Biodiversa+ Consortium, supervising two postdoctoral researchers, four PhD students, and several master's students. I have designed project frameworks, knowledge-co-production processes, transdisciplinary methodologies, and public-facing outreach initiatives, including an artist-in-residence program. My future research will deepen knowledge on effective conservation, biocultural diversity, and actionable pathways for sustainability transformation, while expanding collaborations across Spain, Europe, and the world.

Resumen del Currículum Vitae:

I am a researcher at the University of Bergen (UiB) UNESCO Chair on Sustainable Heritage and Environmental Management. I have a multi-disciplinary background; in addition to a PhD in applied environmental science, I have trained in Sustainability Science, Systems Thinking and Social-Ecological Systems. I have published widely with a clear commitment to academic rigor with 20 high impact publications (>65% main author) in high-ranking journals such as Nature, Proceedings of the National Academy of Sciences, Global Environmental Change, Current Opinion in Environmental Sustainability and Land Use Policy amongst others. My H index is 13 with 544 citations (Google Scholar, 05/12/25). I have obtained over 2.5 million euros in externally funded projects, including large international collaborations and research consortia. I'm the PI of three projects and coordinator of 12 partners across North and South America, Africa and Europe, including academic institutions, intergovernmental organizations and local community partners. At the UNESCO Chair I lead my own group with 3 funded projects. I have supervised 1 PhD student to completion and am currently supervising 3 PhD students (1 main, 2 co-supervisor) and two postdocs.

My research focuses on the dynamics of coupled human and natural systems; social-ecological systems, including sustainable land-use, conservation, participatory natural resource management, ecosystem services, biocultural diversity, and sustainable food systems. I have led efforts to generate knowledge from place-based sustainability initiatives and demonstrate the contributions of multi-use working landscapes to equitable and effective biodiversity conservation. I bring together social and ecological methods for understanding effective avenues for the conservation of biological and cultural diversity, as well as the development of methods for measuring nature's contributions to people. I am skilled in the application of problem-driven mixed-methods research, including statistical analysis, spatial analysis, network analysis, survey analysis, qualitative analysis, and participatory group workshop methodologies. I have skills in inter and transdisciplinary collaborations, including approaches to knowledge co-production in large groups.

I have participated in international conferences and events showcasing my work (e.g. International Union for Conservation of Nature Congress, Ecological Society of America Conference), including organizing of sessions and side-events (e.g. UNESCO World Biosphere Reserve Conference 2025). I have worked extensively to increase societal and policy implications of my work, notably with UN institutions, through invited talks and development of joint reports and policy briefs. For my dedication I was named Spokesperson for the UNESCO Man and Biosphere Programme in 2021 by Dr. Jane



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Goodall. I was also selected in 2022 to be a member of the Postdoc Academy for Transformational Leadership, which trains emerging researchers who lead sustainability research for societal impact. I have received many other awards during my career including Premio Extraordinario de Licenciatura, and the AENZ publication award for my PhD thesis. I have been guest editor in Current Opinion in Environmental Sustainability, and guest researcher at multiple institutions (UC Berkeley, Stockholm Resilience Centre).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: RIBOLDI, JACOPO
Referencia: RYC2025-054321-I
Correo Electrónico: jacopo.riboldi@env.ethz.ch
Título: Atmospheric dynamics for a changing climate
Resumen de la Memoria:

My work blends pure dynamical meteorology with climate science, using a weather-system perspective to study how the large-scale circulation will respond to anthropogenic global warming.

My key scientific contributions concern 1) fundamental atmospheric dynamics, especially the topic of Rossby wave propagation and circumglobal Rossby wave patterns; 2) spatially compounding extremes events, in the sense of co-occurring extreme events in different regions of the globe; 3) the dynamics of extreme weather events of any kind (heatwave, cyclones, cold spells, heavy precipitation events...); 4) the role of tropical-extratropical interactions in shaping the extratropical circulation.

I am currently managing a small research team (1 PhD, 2 MSc students), established at ETH Zurich thanks to a 4-year project grant (€771.000) of which I am Principal Investigator. The focus of the project is on the role of radiative cooling in shaping the contrast between the cold land and the warm ocean surface during winter. This process modulates the amount of cold air over the continental land masses, and in turns determines the strength of the meridional temperature gradient in which extratropical cyclones develop. I am also generally interested in processes happening at the cold side of the jet stream, such as the one studied in the North Atlantic Waveguide and Downstream Impact Campaign, of which I am part.

My future research aims to elucidate how the interplay between changing atmospheric dynamics and the extra energy provided by anthropogenic global warming fuels and "supercharges" extreme weather events, with a focus on extratropical and high-latitude regions such as Europe. To do so, I plan to adopt a variety of approaches, among them the use of air parcel trajectories to diagnose anomalous energy uptakes enhanced by global warming. I am also interested in the AI revolution in weather and climate modeling, especially in how such models represent the meteorological circulation features involved in extreme weather events (such as the infamous upper-level, cut-off cyclones related to many European extreme events).

Resumen del Currículum Vitae:

I am currently a Senior Scientist and a Lecturer in Meteorology at the Institute for Atmospheric and Climate Science of ETH Zurich, one of the world's leading research institutions in weather and climate science. I also serve in the Institute Council as representative of senior scientific staff.

My research bridges pure dynamical meteorology and climate science. I address fundamental climate dynamics questions using a weather-system perspective, especially about how anthropogenic global warming is reshaping the atmospheric circulation. My core topics include the dynamics of atmospheric Rossby waves, the drivers of spatially compounding extreme events (physically linked extremes occurring simultaneously in distant regions), and the influence of non-adiabatic processes on extreme weather development.

I earned my PhD at ETH Zurich in 2018 and subsequently held two post-doctoral positions, first at the Laboratoire de Météorologie Dynamique in Paris, then at the University of Uppsala in Sweden. These international experiences helped me build a broad European network: I have collaborated directly with at least 25 colleagues from 13 institutions, and this not counting the many additional co-authors on my papers. I also have coordination roles in large international projects such as the North Atlantic Waveguide and Dry Intrusion Campaign (NAWDIC) and the European University Radiosonde Partnership (EUROP).

As principal investigator I have secured over €770.000 in external funding in the last five years, enabling me to establish a small research group composed by a PhD and two MSc students. I have supervised in my career eight undergraduate/graduate students, including two PhD candidates.

To date I have authored 20 scientific works (18 peer-reviewed papers and 2 preprints); my research appears in Chapter 10 of the latest IPCC report and has been published in renowned journals including Geophysical Research Letters and Weather and Climate Dynamics. I have presented at more than 35 conferences, workshops, and seminars, often as an invited speaker.

I am serving as Associate Editor of Monthly Weather Review (American Meteorological Society) and am, since 2025, a member of the editorial board of Weather (Royal Meteorological Society, UK).

Since 2024 I have convened the session "Rossby Waves and Jet Stream Dynamics, and Their Impacts on Extreme Weather and Climate Events" at the European Geophysical Union annual meeting. The session has earned the Equality, Diversity and Inclusion (EDI) seal for the past five years, reflecting my commitment to promoting colleagues of diverse genders, backgrounds, and career stages. Together with four European collaborators I am also organizing the "Workshop on Rossby Waves, Compound Extremes and Impacts," scheduled for January 2026 in Amsterdam.

My work has been featured in media outlets such as Le Monde, the Neue Zürcher Zeitung, and Newsweek. I have also carried out outreach activities with schools in Lombardy (Italy) and have led three town hall meetings to discuss climate-change projections and water availability for the cross-border region between Italy and Switzerland.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: MIGUEZ SALAS, OLMO

Referencia: RYC2025-054782-I

Correo Electrónico: olmoms@ugr.es

Título: Dr.

Resumen de la Memoria:

During my PhD, I gained significant international experience through three funded stays (8 months total): National Taiwan University (2018) ☐ Led first international project as PI on Miocene paleoenvironmental changes, covering full research cycle (Ministry of Science and Technology of Taiwan).

MBARI, USA (2019) ☐ Collaborated on deep-sea benthic bioturbation studies, introducing ichnological analysis to the group; resulted in ongoing collaboration and multiple publications (FPU stay call).

National Oceanography Centre, UK (2021) ☐ Worked on echinuran worm traces, initiating a productive partnership (FPU stay call).

These experiences and a great publication record, combined with participation in international conferences, built a strong global network and contributed to receiving the Extraordinary Doctoral Thesis Award.

Postdoctoral Career:

2022: Humboldt Research Fellowship at Senckenberg Institute (Germany), focusing on tracemakers and bioturbation impacts; led multiple publications and collaborations. Then, I was awarded Juan de la Cierva and Margarita Salas fellowships (declined the former to prioritize international experience and joining international expeditions; see CVA). Led gear deployments during AleutBio expedition and developed a project at the National Oceanographic Centre (UK) (see CVA).

2023☐2024: Continued research at Senckenberg and University of Granada with the Margarita Salas fellowship; yielded several contributions.

2024: Appointed Postdoctoral Research Associate at Yale University for experimental ichnology project.

2025: Started as Beatriu de Pinós fellow at University of Barcelona; granted José Castillejo for a 6-month stay at University of Melbourne in 2026.

Overall: 29 months of international experience, leadership in projects and expeditions, strong publication record (42 research papers, being the first author in 26 of them), and sustained international collaborations.

Nowadays, I study animal-sediment interactions (ichnology) in the fossil record and in combination with modern examples. By comparing modern (neoichnology) and fossil (paleoichnology) traces, we can connect the past and the present as ☐The present is the key to the past☐ (Charles Lyell; 1797-1875), building a bridge between two time-scales that are commonly challenging to connect. My line of research now is based on the application of ichnological studies to: 1) infer benthic fauna diversity and density and address how seafloor bioturbation intensity may affect global biogeochemical cycles; 2) calibrate the trace fossil record; and 3) evaluate how abiotic factors control bioturbation in past and future oceans. Throughout the RyC fellowship, I pretend to continue and develop these three research lines (see Memoria RyC 2025).

Resumen del Currículum Vitae:

I graduated from the Degree in Geology in 2016 and the Master degree in Geology Applied to Mineral and Energy Resources in 2017, both from the University of Granada (UGR), Spain. Along those years, I started working on research thanks to the Collaboration grant (Spanish Government) and the Initiation to research grant (UGR). After that thanks to excellent grades, I got a FPU fellowship (Ministry of Spain) to do the PhD, obtaining the maximum qualification Cum Laude in October 2021, with international mention. Also, I was awarded with the Extraordinary Doctoral Thesis Awards in Science by the UGR. Along the PhD period, I did 3 international stays in different institutions (8 months in total): NTU (Taiwan), MBARI (USA), and NOC (UK). After my PhD, I was awarded with the very competitive Humboldt Postdoctoral Fellowship and I started as a Postdoctoral Researcher at the Senckenberg Research Institute Frankfurt in 2022. In 2023, I was awarded with a Juan de la Cierva-Formación (rank 3/124; score 99.4/100) and a Margarita Salas (rank 1/11; score 98.3/100) fellowships. After thinking about it carefully, I declined the Juan de la Cierva in order to obtain more international experience and lead the Ocean Floor Observatory System (OFOS) during the AleutBio expedition (SO293), since the Margarita Salas allows the researcher to be abroad for one year (2023). In 2024, I was appointed as a Postdoctoral Research Associate (5 months) by Yale University to lead an ichnological experimental project and to collaborate with Prof. Lidya Tarhan (reaching up to 29 months as an international postdoc). Also in 2024 I was granted with a Postdoctoral Contract (EIDIA) + Assistant Professor extension at the UGR (Junta de Andalucía call) and a Beatriu de Pinós. I declined the EIDIA contract because the Beatriu de Pinós position gives more time for international mobility. Thus, I am now a Beatriu de Pinós Fellow at the University of Barcelona. I was granted a José Castillejo grant (2024 call) for a research stay abroad this year, so I will be a visiting researcher at the University of Melbourne for 6 months in 2026.

I have published 42 research papers (41 in SCI journals), being the first author in 26 of them. Moreover, I have presented my research in more than 30 scientific meetings (the majority of them in international congresses). Despite my young research career, I have been Principal Investigator of 4 international and 3 national research projects, and Participant in other 5 (all National). I supervised two bachelor internships (Goethe University, Germany) and one postgraduate associate (Yale University, USA). I am currently supervising 3 TFGs and 2 TFGs at the University of Barcelona. I have experience in national teaching at the UGR (150h), UB (60h) and also in international teaching (invited lecture) at the South Dakota School of Mines, USA. I have received some recognitions as Best poster award at the SEP meeting 2018, and the Research Grant by the Spanish Palaeontological Society. I have been a reviewer for more than 15 international journals (e.g., Nature Communications, Sedimentology). I would also like to include my compromise in outreach, participating and organizing workshops and social science activities in Spain (researchers☐ night, outreach talks, TV shows, podcast) and Senckenberg Museum (open day museum, collection showcase).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: SILIANSKY DE ANDREAZZI, CECILIA
Referencia: RYC2025-054815-I
Correo Electrónico: cecilia.s.andreazzi@gmail.com
Título: From ecological networks to public health: Integrating biodiversity, disease ecology, and socio-environmental change

Resumen de la Memoria:

Cecilia S. Andreazzi is an ecologist and evolutionary biologist whose research integrates ecological networks, eco-evolutionary dynamics, disease ecology and socio-environmental modelling under a One Health framework. Her trajectory is characterized by strong interdisciplinary grounding, international mobility, and scientific leadership across three complementary lines: (i) ecological and evolutionary dynamics of species interaction networks, (ii) eco-epidemiology of zoonotic and vector-borne diseases, and (iii) socioecological vulnerability of ecosystems and disease risk. During her PhD at the Universidade de São Paulo (2012–2016), she developed influential theoretical models on coevolution and eco-evolutionary feedbacks, producing highly cited contributions in leading journals and establishing long-term collaborations with leading European and American researchers. As a researcher at Fundação Oswaldo Cruz (Brazil), she expanded her work toward parasite ecology and zoonotic outbreaks, integrating ecological modelling, landscape ecology, epidemiology and public health. Her internationalization includes a funded research stay at EAWAG (Switzerland), a FCT project at Universidade de Coimbra (2021–2022), and a Marie Skłodowska-Curie Fellowship at Universidad Complutense de Madrid (2022–2023). She is now a senior postdoctoral researcher at the same university (Atracción de Talento Investigador from Comunidad de Madrid), where she leads an emerging group focused on socio-ecological determinants of disease emergence and ecosystem resilience. Dr. Andreazzi has 40 peer-reviewed publications (17 as leading or senior author), half in Q1 journals and ten in the top 10%. Her work has accumulated >1000 citations (h-index 20), with excellent scientific impact (FCR>12 in her top papers) and strong societal visibility (14 articles >80th Altmetric percentile). She applies open-access and FAIR-aware research practices, sharing data and code whenever possible, and has produced policy briefs, technical reports, outreach videos, podcasts and numerous media engagements. She has secured ~500k € as PI in highly competitive calls in Brazil (CNPq, FIOTEC, SinBiose, Serrapilheira), Portugal (FCT) and Spain (MSCA, Atracción de Talento). She leads work packages and tasks in international projects funded by NSF and Horizon Europe and is part of international consortia connecting institutions across Europe, the Americas and Africa. She co-founded the PICTIS platform (Portugal), serves on its scientific committee, leads its One Health/Global Health Lab, and is a member of the UN Science Panel for the Amazon. Her teaching and mentoring record includes the (co-)supervision of 7 PhD theses (5 ongoing), 3 MSc, 3 BSc projects and 5 postdoctoral researchers, as well as lecturing across postgraduate and undergraduate programs. Through her projects, she has enabled research exchanges between institutions in Brazil, Colombia and Spain. Recognized as R3 by the Agencia Española de Investigación, Dr. Andreazzi is now positioned to consolidate an independent research program in Spain. The Ramón y Cajal contract will allow her to expand her group, compete for major national and European calls, and develop innovative socio-ecological network approaches to predict and prevent zoonotic disease risks in a rapidly changing world.

Resumen del Currículum Vitae:

Cecilia S. Andreazzi is an ecologist and evolutionary biologist specialized in ecological and evolutionary modelling, species interaction networks, and zoonotic disease dynamics. Her work integrates biodiversity science with public-health applications under the One Health framework. During her PhD at the Universidade de São Paulo (2012–2016), she developed innovative models of coevolutionary dynamics that advanced understanding of eco-evolutionary feedbacks in complex networks. At Fundação Oswaldo Cruz (Brazil), she expanded her research to parasite ecology and the drivers of zoonotic outbreaks. Her international trajectory includes a FCT-funded project at Universidade de Coimbra (Portugal, 2021–2022), followed by a Marie Skłodowska-Curie Fellowship at Universidad Complutense de Madrid (2022–2023). She is currently a senior postdoctoral researcher at UCM through the Atracción de Talento Investigador program (Comunidad de Madrid), where she leads an emerging group focused on socio-ecological interactions and disease emergence. She has carried out research stays in Switzerland, the USA, Belgium, the Netherlands, and Argentina, organized scientific workshops in Brazil, Argentina, Switzerland, and Spain, and participates in four international consortia involving institutions from Europe, North and South America, and Africa. This has enabled her to build a strong international collaborative network. Dr. Andreazzi has 40 peer-reviewed publications (17 as leading or senior author), half in Q1 journals and ten in the top 10%. Her research has received over 1,000 citations (h-index 20), and her ten most cited papers average a Field Citation Ratio above 12. Fourteen articles have high societal visibility (above the 80th Altmetric percentile). She applies open-access and FAIR-aware practices, sharing data and code when possible. Her outreach includes policy briefs, technical reports, popular science articles, podcasts, videos, and more than 40 media contributions. She has secured ~500k € (excluding salary) as PI from competitive programs in Brazil (CNPq, FIOTEC, SinBiose, Serrapilheira), Portugal (FCT), and Spain (MSCA and Atracción de Talento). She has also led a work package and a task in international projects funded by NSF and Horizon Europe, and contributes to several national and regional projects. Her leadership roles include membership in the United Nations Science Panel for the Amazon, co-founding the PICTIS platform (Portugal) where she leads the One Health/Global Health Lab, and co-creating the IRIS sustainability network in Brazil. She also served on the Brazilian COVID-19 Scientific Committee and is/was an editor for three scientific journals. Dr. Andreazzi has (co-)directed seven PhD theses (five ongoing), supervised three MSc and three BSc students and five postdocs, taught in postgraduate and undergraduate programs, and participated in eleven thesis committees. Her projects have facilitated researcher exchanges between Brazil, Colombia, and Spain. She recently obtained the R3 certificate with the highest score (100/100).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GONZÁLEZ CAMEJO, JOSUÉ
Referencia: RYC2025-055631-I
Correo Electrónico: josue.gonzalez@uvic.cat
Título: Circular and sustainable biorefineries to recover water, energy and bio-products from liquid and bio-solid waste streams

Resumen de la Memoria:

J. González Camejo is a senior researcher at BETA TC (UVIC), specifically, in the "Environmental Technologies and Circular Bioeconomy" unit. His research career (2014-25) has been developed in diverse organisations:

i) Polytechnic University of Valencia (UPV) (2014-2019), where he obtained his PhD in 2019 in Hydraulic and Environmental engineering, getting the cum laude qualification and the international mention (predoctoral stay at the Polytechnic University of Milan). His thesis was funded by the Ministry of Education, Culture and Sport via FPU predoctoral grant. He received the prize for the best doctoral thesis on Innovation in the Integrated Water Cycle of the FACSÁ-UIJ Chair (2021).

ii) University of Valencia (UV) (2019-2021), where he participated as member of the AVI-MICROPLAST project.

iii) Polytechnic University of Marche (UNIVPM) (Italy, 2021-2024). The applicant received a HE-Marie Curie postdoctoral grant to fund MicroAlgae 4.0. This project allowed the researcher to implement a research line in the host institution, i.e., microalgae-based treatment and bio-product production. Before obtaining that grant, the researcher also received a Margarita Salas postdoc fellowship (funded by the Spanish Ministry of Universities) and an APOST21 postdoc fellowship (funded by Generalitat Valenciana). During this stay, J. González-Camejo was benefitted from the host's experience in EU-funded projects, having a leading role in the following projects: WP-leader in H2020-HYDROUSA, PRIMA-SURENEXUS; case study leader in H2020-SEA2LAND, H2020-ULTIMATE, H2020-AquaSPICE. This enabled the researcher to acquire knowledge and experience in environmental engineering, water reuse technologies, risk assessment, and organic waste treatment and recovery of bioproducts; and sustainability assessment.

iv) BETA TC at UVIC (2024-currently). The researcher has a senior role coordinating research on photosynthetic systems (microalgae and purple phototrophic bacteria) for treating liquid streams from livestock wastes (e.g. digestates) to recover water, nutrients and other resources. He obtained a mobility fellowship ("Beatriz de Pinos within MSCA-COFUND) to fund ALGAE-STATE project. He has also participated in: HE-SEMPRE-BIO, ALGA-GESTION and DEPURHOB. Additionally, he has coordinated a project proposal on HE-FARM2FORK call: DROP2CROP (under evaluation).

The applicant is willing to spread his knowledge and widen his network in the following research lines:

- Biorefineries to treat agri-food waste and produce valuable agricultural bio-products (biofertilisers, biostimulants, biopesticides).
- Microalgae and purple phototrophic bacteria (PPB) cultivation to implement novel photorefineries
- Digestate and CO₂ valorisation from biogas plants to produce biochemicals and alternative protein.
- Water reuse from the agri-food sector for agricultural and industrial purposes.
- Risk assessment of the recovered bio-products from biorefineries/ photorefineries and other circular processes, including reclaimed water.

Modelling and process optimisation supported by digital tools and machine learning methods.

Resumen del Currículum Vitae:

During his research career, the applicant has proven to be very active and has produced high-quality and high-impacting results, contributing significantly to the scientific community. He has published a total of 39 peer-reviewed articles (total citations > 1125; h-index=19; avg. IF=6.1), being 24 of them published in high-impact journals (Q1). His contribution to those articles has been very relevant, being the first author in 19/39, the corresponding author in 20/39 articles and last author in two of them. Moreover, he has contributed to 36 presentations to international and national congresses (25 oral and 11 posters) and has been the first author of one book chapter and co-author of another one. Most of his publications are related to microalgae-based wastewater treatment, which is his main topic, and accounts for 23 publications during 2017-2025, 16 of them as first author. His publications have impacted the scientific community significantly, showing average citations of 29 per manuscript. Due to his activities, the researcher has been recognised with an official certification of "six-year period of research (sexenio)" (2015-2020).

Regarding training and mentoring, the researcher supervises the PhD thesis of G. del Puerto. He has also co-tutored 3 master students at UPV, 6 master students at UV, 5 master students and 1 bachelor student at UNIVPM. Moreover, the researcher has participated as evaluator in the Water4All 2024 Joint call; as guest editor in several journals (Water; J. App. Water Eng.; Front. Plant Sci.); been selected as expert of the EIT-Water Scarcity in Southern Europe (2022); participates in the Biorefine Cluster Europe (www.biorefine.eu); and he is member of diverse Cost Action programmes (PurpleGain, Water4Reuse, ParAqua), and of Marie Curie and Climate-KIC Alumni Associations. Furthermore, the applicant has been involved in the following collaborative work with end-users:

- ALGA-GESTION project funded under the call: "Projects for public-private collaboration"; where the researcher collaborates with Fertinagro company.
- H2020-ULTIMATE. The researcher collaborated with ARETUSA, a public-private partnership (PPP) that has been established in Central Italy between an urban water utility (ASA SpA), an industry (SOLVAY Chimica Italia), and a technology provider (Termomeccanica).
- ECOSEDRA. This project is implemented by a consortium of Italian companies (SO.GE.IN Srl, BCB ELECTRIC Srl, FIORI Costruzioni Srl).
- Comparative and Functional Analysis of Integrated Experimental Anaerobic Digestion Plant for Biomethane Production and Chemical Sequestration of CO₂. In collaboration with the company SIMAM from Gruppo ASAC (Senigallia, Italy).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: POZO BUIL, MARIA MERCEDES
Referencia: RYC2025-057225-I
Correo Electrónico: mer.pozo.buil@gmail.com
Título: Understanding climate variability and change along the U.S West Coast

Resumen de la Memoria:

The California Current System (CCS) is a global hotspot of productivity and climate vulnerability, where changes in large-scale ocean circulation and water-mass properties strongly shape local coastal habitats and the services they support. Yet most climate projections for this region are too coarse to resolve key coastal processes, extremes, and potential climate refugia along the California coast. This proposal aims to deliver a new generation of high-resolution projections and tools that can identify where, when, and under which scenarios future climate stressors may be buffered or amplified. I will combine dynamical and statistical downscaling of CMIP6 Earth System Models to generate daily, ~3 km projections of physical and biogeochemical conditions in central California waters through 2100. In Task 1, I will extend existing 1/10° downscaled projections for the northeastern Pacific by nesting a 1/30° regional ocean-biogeochemical model configuration tailored to the CCS. This model, built on ROMS coupled to a customized NEMUCSC ecosystem module, has been extensively evaluated and is well suited to capture coastal upwelling dynamics, subsurface habitat changes, and fine-scale variability relevant to marine ecosystems and coastal communities.

In Task 2, I will develop an ensemble statistical downscaling framework that uses the 3 km CCS configuration as an observation-constrained reference to statistically downscale a broader suite of CMIP6 models and scenarios (SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5). Focusing on a set of variables and depths most important for key CCS species and processes, this task will produce habitat-relevant projections that explicitly represent both model and scenario uncertainty, and will allow a systematic comparison of the added value and complementarities of statistical versus dynamical downscaling.

Task 3 will diagnose future climate stressors and extremes (e.g., marine heatwaves, deoxygenation events, compound anomalies) from both downscaled products, and use these metrics to identify and characterize potential climate refugia along the California coast. I will assess the persistence, robustness, and drivers of these refugia across models and scenarios, helping to clarify where coastal systems may retain relatively stable conditions or recover more quickly under ongoing climate change.

In Task 4, I will integrate projections and refugia metrics into an interactive web-based decision-support tool. This platform will visualize high-resolution projections, extreme-event statistics, and refugia indices, with flexible options to explore ensemble behavior, thresholds, and uncertainty. Users will be able to examine spatial and temporal patterns, compare scenarios, and download map layers and concise reports for areas of interest.

Together, these activities will deliver high-resolution, multi-scenario projections; a quantitative understanding of future climate stressors and refugia along the California coast; and a transparent, accessible tool that supports climate-ready planning for the CCS.

Resumen del Currículum Vitae:

I am currently an Associate Project Scientist with the Institute of Marine Sciences (IMS) at the University of California, Santa Cruz (UCSC). I have been successful in securing \$3.2M in research funding as a principal investigator and an additional \$1.3M as a co-principal investigator. I have published 45 peer-reviewed papers and led projects that bring together interdisciplinary teams from academia and federal agencies. Over the past 5 years, my projects have supported my full-time salary, two full-time graduate students, three postdoctoral scholars, a project scientist in marine ecology, and 12 months of other personnel.

My research is user-inspired which allows me to work with and learn from an interdisciplinary group of researchers who use my forecasts, projections and ocean products in ecology, fisheries, social sciences, and management applications. For example, I currently lead two projects: one investigating key large-scale climate and oceanic processes that affect coastal ocean biogeochemistry, including their predictability at different timescales; the other focuses on quantifying and communicating social and ecological knowledge alongside climate scenarios to support climate-ready decision-making for fisheries management. Additionally, I am co-PI on two complementary projects: one focuses on improving an implementation of a regional ocean model for the Northeastern Pacific, with an emphasis on enhancing the representation of upwelling dynamics and generating climate-informed information to support fisheries management; the other focuses on assessing climate vulnerability, impacts, and adaptation pathways for fishing communities that depend on species such as sardines and abalone. These projects rely on seasonal forecasts, decadal predictions, and regional projections of ecosystem-relevant ocean conditions, tools that I have built and refined as part of a dynamic, interdisciplinary effort.

I am deeply motivated to advance physical oceanography and regional ocean-climate modelling to better understand the mechanisms of ocean variability across time scales. My broader goals are to: (1) improve downscaling frameworks to generate high-resolution regional predictions across seasonal to multi-decadal timescales; (2) integrate climate-ocean modelling to support resilient fisheries and coastal communities; and (3) assess how ocean circulation influences ecosystem dynamics and climate feedbacks.

I have pursued a range of teaching opportunities including mentoring, teaching undergraduate courses, guest lecturing, and designing lesson plans and activities for graduate courses. My teaching is learner-centered, with a focus on real world contexts. I have directly supervised a postdoctoral researcher, and am currently co-supervising two postdoctoral scholars, a graduate student, an undergraduate student, and a project scientist in marine ecology. As part of my Teaching Practicum, I developed, designed, and taught six classes for the Introduction to Oceanography Course at Georgia Tech. I was also the instructor of record for a class that assists first-year students transitioning successfully to the university in their first two years. I have designed three inquiry activities through the backward design approach for transfer students at UCSC, with the focus of strengthening equity and inclusion through their design and facilitation.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: FERNÁNDEZ MARCHÁN, DANIEL
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Título: Biodiversity, ecology and evolution of European earthworms

Resumen de la Memoria:

My research career has revolved around evolutionary biology, focused on soil invertebrates and earthworms as models. My work has involved different aspects of soil biodiversity, integrating alpha-taxonomy, ecological modelling, morphology and molecular biology.

During my PhD theses stage, I implemented novel morphological techniques (scanning electron microscopy of chaetae, microcomputed tomography), molecular phylogenetics (multigene phylogenetics, GBS) and ecological niche modelling to an endemic Mediterranean earthworm family. This resulted in the description of 11 new species and the systematic revision of the family Hormogastridae.

My post-doctoral career has focused on evaluation of diversity and evolutionary origin of Western Mediterranean earthworms, the study of their impact on natural and managed habitats (as main ecosystem engineers) and their molecular mechanisms of adaptation to the environment. This line of research started with a Juan de la Cierva-Formación Fellowship in the University of Vigo. There, I continued to increase my knowledge on the taxonomy and ecology of Iberian Lumbricidae and incorporated rare, narrowly distributed genera to the phylogenetic framework of Domínguez et al. (2015). This line of research has currently resulted in the erection or revision of 9 earthworm genera. I also developed a proof-of-concept for integrative ecological and genetic conservation status evaluation of endemic earthworm species. My research career continued with a 1 year stay at CEFE, Université de Montpellier collaborating with Prof. Thibaud Decaëns thanks to a MOPGA Postdoctoral Fellowship. This stay complemented my training in community ecology and on the effect of climate change on earthworms. I also took advantage of dense sampling and community-wide genetic barcoding of soil biodiversity hotspots to develop comparative phylogeographic studies and a two-stage species discovery pipeline: this resulted in 21 newly described species. A new line of research was started on the diversity, ecology and evolution of Scherotheca, one of the most diverse genera of Lumbricidae with the largest known species of the continent. In addition, Anchored Hybrid Enrichment was implemented as an affordable and flexible phylogenomic tool to supplement barcoding (population level) and multigene phylogenies (interspecific relationships) solving relationships between genera and above.

After benefiting from a María Zambrano Postdoctoral Fellowship I incorporated to the Department of Biodiversity, Ecology and Evolution (Universidad Complutense de Madrid) and obtained a position as Profesor Ayudante Doctor. There, I co-lead the Soil Zoology research group and I'm currently developing the project PID2023-146107NA-I00 (Proyectos de Generación de Conocimiento 2023) as Principal Investigator. This project integrates ecology, phylogenomics and molecular evolution to study the parallel evolution of giant earthworms in three different clades, identifying their origin in space and time, the main environmental causes for their evolution, the putative genes associated with their novel phenotype and their effect on their habitats and communities.

Resumen del Currículum Vitae:

During my PhD theses stage, I was funded by a UCM-Santander PhD grant, and published 19 manuscripts.

My post-doctoral career started with a 2-years Juan de la Cierva-Formación Fellowship in the University of Vigo with Prof. Jorge Domínguez. I received an EMBO Short-Term Fellowship and a Systematic Research Fund grant to fund a short stay for sampling in France and molecular phylogenetic analyses. Later, I received a MOPGA Postdoctoral Fellowship to stay one year at CEFE, Université de Montpellier with Prof. Thibaud Decaëns. After benefiting from a María Zambrano Postdoctoral Fellowship at the Universidad Complutense de Madrid, I'm currently holding a position as Lecturer (Profesor Ayudante Doctor) at the same institution. I was awarded a Junior Leader & Retaining postdoctoral fellowship by Fundación La Caixa; however, incompatibility with the Lecturer position forced me to decline it. In the light of its outstanding evaluation, this project was used as the base for a project proposal in the "Proyectos de Generación de Conocimiento 2023" (Spanish Government) call, which was awarded to me as PI. It is noteworthy that the work group includes members of 4 different European countries.

In total, I have contributed to 67 publications (25 as first author, seven as senior author). Twenty-six of them were published in Q1 journals. These results were communicated in 16 international congresses and symposia (one of them as invited Keynote speaker), for a total of 37 posters and oral communications. Additionally, I was the president of the organizing committee for the 9th International Oligochaeta Taxonomy Meeting (December 2023, Madrid) and member of the Scientific Committee for the 10th IOTM (November 2025, Croatia).

I have created a network of collaborators with international institutions from Hungary, Italy, Croatia, Serbia, Russia, Finland, Sweden, Portugal, France, Algeria, Marroc, Pakistan, USA and Brazil, offering my taxonomical and molecular phylogenetics expertise in exchange for chances to study their local faunas. The resulting accumulated knowledge (and my participation in the description of 55 species) has led to my recognition as one of the leading earthworm taxonomists of my generation.

In order to share my knowledge with the general public and to increase awareness of the importance of earthworm diversity for the ecosystems, I have disseminated my results through press notices and radio interviews in different media. I have also contributed as a taxonomy expert for the citizen science platforms "Biodiversidad Virtual" and iNaturalist, and for the French citizen science project Vers#2022.

I have made the training of young scientists and the transmission of knowledge one of the objectives of my career, from undergraduate and MSc teaching (628.5 hours) to Final Degree (3)/Master Degree (4) project and PhD thesis (3, 2 ongoing) supervision; I have also provided taxonomic training to visiting researchers from Argelia and Pakistan, and MSc students from France.

My editorial activities have included my collaboration with 20 scientific journals as reviewer, my role as thematic editor for Zootaxa and Animal Taxonomy and Ecology, and as invited editor for a special issue of Diversity.

I have been appointed member of the Edaphobase Data-Quality Review Board as a taxonomic expert and of the IUCN Species Survival Commission.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: ROMERO HARO, ANA ÁNGELA
Referencia: RYC2025-054935-I
Correo Electrónico: ana.romero@mncn.csic.es
Título: Physiological stress, ageing, and life histories: an evolutionary ecology perspective
Resumen de la Memoria:

My research line focuses on unravelling how environmentally or paternally induced stressful conditions shape individuals' life-history strategies and ageing trajectories, with a special emphasis on early development and reproduction periods. Throughout my career, I have adopted a highly integrative research approach, combining ideas, methods and techniques from fields such as Evolutionary Biology, Ecophysiology, Animal Behaviour and Molecular Ecology. My work links proximate mechanisms with ultimate consequences at both longitudinal and intergenerational levels. I bet for long-term, ambitious approaches, which are highly valuable in Science.

My expertise has steadily expanded since completing my degree in Biological Sciences. During my first Master's, I studied the effects of chronic social stress on spatial learning in mice. I then moved to Uruguay and Argentina to study wild animal behaviour. In both periods, I obtained my first scientific manuscript and my first poster in a congress, respectively.

During my PhD, I examined how an experimental increase in early-life oxidative stress affected the life-history traits of a captive zebra finch population, monitoring individuals from birth to death. The last bird lived 8 years and 9 months. This long-term study has generated six articles, showing that oxidative stress can modulate evolutionary trade-offs and that its negative effects may only become evident in the next generation. These findings underline the importance of longitudinal and transgenerational approaches and show how short-term studies, which dominate the field, can underestimate such effects.

During my postdoctoral period abroad, I mainly focused on the constraints and costs of reproductive investment. Previously to my Marie-Curie period, I combined ideas from ecophysiology and collective behaviour to show that markers of stress and ageing can constrain the strength of pair bonds in zebra finches. Here, I led a highly collaborative international project, bringing together researchers from multiple institutes and disciplines. During my Marie-Curie project, I studied the direct and transgenerational consequences of divergent reproductive strategies on ageing trajectories in parents and offspring. I used as model a captive quail population in which females had been selected to invest either heavily or lightly in their eggs. In this project, I acted fully as PI.

I led my Maria Zambrano project as PI, working with an emblematic species; the red-legged partridge, focusing on studying the modulators of parental effects. I am currently leading as only PI both my 'Atracción de Talento' and 'Generación de Conocimiento' projects, about the effects of high temperatures on developing birds. I am establishing a new cutting-edge group in the Evolutionary Ecology department of my current institution.

In my 'Ramon y Cajal' period, I will incorporate innovations, including more natural experimental challenges (as high temperatures), the study of unknown aspects of parental effects (as those mediated specifically via the egg or the sperm), and the use of next-generation biomarkers of stress and ageing. I will attain European, national and regional funding, publish high-quality articles, continue disseminating my findings, supervise PhD and Master's students, and collaborate with leading researchers worldwide.

Resumen del Currículum Vitae:

Number of SCI publications: 25, Number in Q1: 21 (84%), Number in Q1 or Q2: 25 (100%)
Total citations: 640 (Google Scholar); 484 (Scopus)
Average citations/year (2022-2025): 40 (WoS); 64 (Google Scholar)
h-index: 11 (WoS); 11 (Google Scholar), 10 (Scopus), i10-index: 11 (Google Scholar)
Number of Master's and PhD Theses supervised (including ongoing ones): 7
Research projects as PI: 5
International collaboration: 76.5% (Scopus), FWCI: 1.25 (Scopus)

I am an evolutionary ecologist focused on how physiological stress shapes the life histories of individuals. My work addresses long-standing scientific questions of broad societal interest, such as: Why and how do we age? Why is there so much variation in lifespan among individuals? What is the physiological cost of rearing offspring? And if I experienced stress during my own early life, can it affect my children? Everything using birds as model organisms. I have adopted a highly integrative research approach, combining ideas, methods and techniques from fields such as Evolutionary Biology, Ecophysiology, Animal Behaviour and Molecular Ecology, and integrating proximate causes and ultimate consequences at both longitudinal and intergenerational levels. I always bet for long-term, ambitious approaches, which are extremely valuable in Science.

My contributions hold high quality and impact. I have published 25 articles (all in JCR), being a relevant author of 16 (64%). All my articles are published in journals of strong reputation, with a low number of co-authors (a mean of four authors per manuscript).

My scientific and technical skill set is exceptionally strong. I enjoy a deep understanding of evolutionary ecology theory, further enriched by extensive international experience. My technical expertise is equally broad: I have developed state-of-the-art experimental procedures and I dominate innovative techniques for quantifying stress and ageing. This includes, for example, my certification to work with radioactive materials, which is required for



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

telomere quantification by the TRF method. A substantial part of my postdoctoral career was conducted abroad (in the UK), and I have stayed in several renowned European institutions, including the Max Plank Institute, The University of Strasbourg, the University of Groningen and the University of Zurich (Germany, France, The Netherlands and Switzerland, respectively). I have obtained national and international funding and have extensive experience as a PI, leading my own independent research projects. I obtained a Marie-Curie grant and successfully developed and managed my "María Zambrano" project. I am currently the PI of both an "Atracción de Talento" and a "Generación de Conocimiento" projects.

My research is also of interest to the general public. I have communicated and disseminated my work, reaching the traditional media as "La Cadena Ser". I have participated in in-person events with the general public, sharing my work and adapting it to the audience. I have supervised, and currently supervise, Master and PhD students, whose theses have led to contributions. As with my research, I prioritise quality over quantity in my mentoring.

Due to my high-quality research and my scientific, technical, leadership, funding acquisition, and mentoring skills, I am an ideal researcher for a "Ramon y Cajal" grant.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: FONT MUÑOZ, JOAN SALVADOR
Referencia: RYC2025-055321-I
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Título: Light as a Driver of Phytoplankton Social and Collective Behavior

Resumen de la Memoria:

I am a physicist specialized in marine bio-optics, studying how light not only drives photosynthesis but also allows phytoplankton to perceive their physical and biological environment. I have established an internationally recognized research line showing that diatoms' microalgae responsible for a major fraction of oceanic primary productivity' use light to sense surroundings and communicate with neighboring cells, revealing light as both an environmental sensor and a medium for information exchange that shapes individual and collective behaviors.

During my PhD at CSIC (Thesis: Characterization of size structure and composition of marine phytoplankton by laser diffractometry, 2019), I developed innovative in situ optical methods to study phytoplankton communities, revealing the role of cellular inertia in spatial distribution (J. R. Soc. Interface, 2017) and characterizing community composition through pigment signatures (Mar. Ecol. Prog. Ser., 2018). This work provided the basis for investigating collective microalgal behavior, culminating in the description of pairing in pennate diatoms mediated by hydrodynamic instabilities (PNAS, 2019).

From 2019, as principal investigator of an ANR-funded project (ISblue-HUB, CNRS'IFREMER'UBO), I led an interdisciplinary team discovering that pelagic diatoms emit pulses of red fluorescence for communication (Sci. Adv., 2021). Building on this, I initiated a collaboration with Prof. Angela Falcatore (CNRS) to study light perception and collective responses via phytochromes, showing their functional role in regulating coordinated movements through optical signaling (Nature Communications, in press). Recently, we demonstrated that anisotropic fluorescence emitted by diatoms can reshape the underwater light field (PNAS, 2025), linking microscale signaling to large-scale ecological patterns through satellite remote sensing (Remote Sens. Environ., 2018, 2019; Ocean Science, 2023; JGR Oceans, 2023).

This cohesive research program on the 'optical ecology of phytoplankton' integrates physics, molecular biology, and marine ecology. Currently, as principal investigator of the project Collective behaviour of diatoms guided by bacterial mutualism in exopolysaccharide trails, I study how diatoms influence bacterial colonization and how chemical and optical signals regulate collective activity, combining advanced microscopy, metagenomics, and metabolomics.

I have contributed to over twelve national and international projects, serving as PI in three, supervised three Master's students, and trained early-career researchers in optical techniques, data analysis, and scientific writing. My career has been continuously supported by competitive fellowships and grants (ISBlue, Margalida Comas, Juan de la Cierva [renounced], Vicens Mut), reflecting my ability to secure funding at all stages. My work combines scientific leadership, methodological innovation, and interdisciplinary vision, revealing that microalgae not only capture light energy but also use it to communicate and organize collective life, forming the foundation of my current and future investigations on optical and chemical communication in marine microbial ecosystems.

Resumen del Currículum Vitae:

I am a physicist with a PhD in Marine Ecology from CSIC (2019), specializing in marine bio-optics. My research explores how light not only drives photosynthesis but also enables phytoplankton to perceive, respond to, and communicate with their environment. This perspective combines physics, ecology, and molecular photobiology, and has shaped my contribution to understanding the mechanisms through which microalgae integrate optical information to organize their individual and collective behavior. During my PhD, I developed innovative in situ optical methods to characterize the size structure, taxonomic composition, and spatial organization of phytoplankton communities. These approaches revealed the role of cellular inertia in shaping spatial patterns and uncovered hydrodynamic mechanisms underlying pairing interactions in pennate diatoms (PNAS, 2019; J. R. Soc. Interface, 2017; Mar. Ecol. Prog. Ser., 2018).

From 2019 to 2021, as principal investigator of an ANR-funded project at IFREMER and IUEM-UBO, I led an interdisciplinary team combining physics, marine biology, and quantitative imaging. We discovered that pelagic diatoms emit pulsed red fluorescence as a communication signal between cells (Sci. Adv., 2021), revealing a previously unknown pathway of optical interaction in microalgae. Building on this work, I established a collaboration with Prof. Angela Falcatore (CNRS) to investigate how phytochrome-type photoreceptors mediate coordinated cellular responses to light. This work (Nature Communications, in press) demonstrates that diatoms possess functional phytochromes capable of regulating synchronous movements, providing a mechanistic basis for light-driven collective behavior. In parallel, I integrated microscale observations with satellite remote sensing to understand how optical traits influence regional- to global-scale phytoplankton dynamics (Remote Sens. Environ., 2018, 2019; Ocean Science, 2023; JGR Oceans, 2024). Since 2021, I have been leading research at IMEDEA-CSIC under the Margalida Comas and Vicens Mut fellowships (CAIB), where I continue to investigate the biophysical foundations of microbial interactions. I supervise Master's students and train early-career researchers in optical instrumentation, quantitative analysis, and scientific communication. I have participated in twelve competitive national and international projects, serving as principal investigator in three, demonstrating experience in project leadership, coordination, and resource management. My research program currently focuses on the interplay between chemical and optical communication in diatom' bacteria associations and how these interactions shape microbial organization in the ocean.

Collectively, these achievements demonstrate my ability to develop independent research lines, build multidisciplinary collaborations, and contribute to the international advancement of marine bio-optics and phytoplankton ecology. In addition to research, I engage actively in public outreach through media interviews, invited talks, and educational activities, promoting broader awareness of marine ecosystems and the scientific principles underlying their functioning.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: PINA MIGUEL, MARTA
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Correo Electrónico: martapinamiguel@gmail.com
Título: Filling the gap: searching and reconstructing the ancestors of African apes and humans

Resumen de la Memoria:

I received my PhD in 2016 at the Institut Català de Paleontologia Miquel Crusafont (ICP, Spain). Subsequently, I won two consecutive prestigious postdoctoral contracts: a Japan Society for the Promotion of Science fellowship and a Marie Skłodowska-Curie fellowship. These enabled me to advance my research at Kyoto University (Japan, 2017–2019) and The University of Manchester (UK, 2020–2022). During 2022–2023, I was a Lecturer in Anthroengineering at London South Bank University (UK) and I am currently a Beatriz de Pinós-MSCA-COFUND researcher at the ICP. Since my postdoctoral stay in Japan, I have been affiliated with the National Museums of Kenya (Nairobi) as a Research Affiliate. My postdoctoral stays in Japan and the UK have allowed me to expand my original research focus on European dryopithecines to also include African taxa for a broader evolutionary approach of the hominoid palaeobiology and being trained on evolutionary biomechanic methodologies for a distinctive approach to the study of extinct primate locomotion.

My line of research consists of two interrelated blocks: 1) the development of The Nakali Project; and 2) the enhancement of our understanding about the evolutionary history of hominoid locomotion, with particular attention to the origin of human bipedalism. Nakali (~10 Ma, Kenya) is one of the few Late Miocene fossiliferous sites in Africa, excavated regularly since 2002 by Kenyan-Japanese teams through The Nakali Project. This work has uncovered a diverse array of fossils, including a remarkable primate assemblage with multiple hominoids, cercopithecids, and a galagid, which is unique worldwide. Among these primates, Nakalipithecus nakayamai was described in 2007 as a large-bodied hominoid with morphological affinities with Ouranopithecus from Europe, offering crucial insights into the origin of the great ape and human lineages. However, much remains unknown about Nakalipithecus, including its phylogenetic affinities and paleobiology (e.g., locomotion). My future research aims to illuminate the context of the great ape–human divergence by uncovering essential fossils from this key time period to reconstruct the African great ape–human last common ancestor, explore whether these lineages originated and evolved primarily in Africa, and characterize the Nakali paleoenvironment to understand how climatic changes influenced hominid evolution and their decline in eastern Africa. Additionally, I will investigate whether this decline was linked to the spread of cercopithecids and potential ecological competition between these groups. During my Ramón y Cajal contract, I will direct expeditions in Kenya and conduct laboratory analyses to perform taxonomic, taphonomic, and botanical studies. A vital aspect of this work will involve developing education and outreach initiatives in the Nakali area in collaboration with the National Museums of Kenya. My research will also integrate a palaeobiological approach to the early evolutionary history of hominids using innovative and interdisciplinary methods. Specifically, I will apply evolutionary robotics and engineering techniques to study Miocene hominoid locomotion. This approach seeks to shed light on the origin and early evolution of locomotor modes associated with apes and humans, such as bipedalism, and to better understand the functional adaptations found in extinct species.

Resumen del Currículum Vitae:

I am a palaeoprimatologist and evolutionary biologist specialising in the evolution of primate postcrania and locomotion, including the origins of human bipedalism, and in the emergence and diversification of hominoids. With training in Biology and Palaeontology, I employ multidisciplinary approaches drawn from Engineering and Physics (e.g., CT and finite element analysis). My research investigates anatomical adaptations to reconstruct the locomotor behaviours of the last common ancestors within the hominoid lineage. I focus on Miocene hominoids from Eurasia and Africa through comparative anatomy, functional morphology and biomechanics. My main publications examine limb morphology and internal bone architecture, contributing new insights into extinct Afro-Eurasian apes and early hominins.

I completed my PhD in Biodiversity (UAB, 2016) with a FPU scholarship and secured over €24k in additional competitive funding (AMNH; Leakey Foundation; two Synthesis-3 projects; Estancias Breves FPU). My postdoctoral trajectory (5.7 years) has been highly international and competitively funded: a JSPS fellowship at Kyoto University (2017–2019; 9.10% success; €70.6k) under Prof. Nakatsukasa; a Marie Skłodowska-Curie fellowship at The University of Manchester (2020–2022; 14.19% success; €212.9k) with Prof. Sellers; and a Lectureship in Anthroengineering at London South Bank University (2022–2023). I am currently a Beatriz de Pinós-MSCA COFUND researcher at the ICP (2024–2026; 22.64% success; €152.3k).

As principal investigator, I have secured over €550k across ten projects and contributed to eight regional and national projects. I have published 20 SCI-indexed articles (7 first-author; 18 Q1; 5 in high-impact multidisciplinary journals such as Science and Nature Communications), with 77% in the top 25% by CiteScore and 39% among the top 25% most cited worldwide. My work has received over 539 citations (FWCI = 1.16). I regularly review manuscripts, serve on grant and job-selection panels, and act as Guest Editor for two special volumes. I have delivered 31 conference contributions (15 as first author).

I have ~200 hours of teaching experience, regularly lecturing at the master's level (UB-UAB) and previously designing and leading three modules in a new MSc programme in the UK. I have supervised bachelor's and master's students and currently supervise a PhD student.

I have participated in over 30 palaeontological field campaigns in Spain and Kenya, directing the Creu de Conill site since 2018. Since 2024, I lead The Nakali Project (Kenya), coordinating annual excavations and fossil-collection studies. This year, I obtained funding from the Leakey Foundation and Fundación Palarq and was awarded the L'Oréal-UNESCO For Women in Science Award (in total ~€50k). In the field, I manage and train teams of more than 20 people.

Committed to scientific outreach, I take part in radio programmes, give school talks and authored a popular science book for Salvat. I actively promote women in science (e.g., SRUK's Women in Science Committee) and support STEM training for young African students through the Eastern African Association for Paleoanthropology and Paleontology and the National Museums of Kenya, where I have been an Affiliated Researcher since 2018. I recently obtained a J.C. Donner Field School Scholarship to support a Kenyan student in the 2025 CCN campaign.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MASSAINE MOULATLET, GABRIEL
Referencia: RYC2025-054456-I
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Título: From community ecology to macroecology: assessing the fundamental relationships between species distribution, environmental gradients and anthropogenic impacts

Resumen de la Memoria:

1. In my MSc thesis, I investigated the role of hydrological and topographic factors driving the distribution of understory plants in Amazonia. A long-standing ecological question at that time was whether plant biogeography was determined by hydrological conditions driven by topography, and my research was able to show that plant species segregate their niches along hydrological gradients as determined by the distance to the water table.
2. My PhD thesis investigated how Amazonian plant biogeography was characterized by Quaternary geological changes in the environmental conditions. Using remote sensing data, botanical data from several parts of Amazonia, and comprehensive environmental characterization, I showed that Amazonian flora is largely influenced by the geological background determined by the Andes uplift and the reconfiguration of the Amazon River networks. This complex dynamic landscape has created a mosaic of environmental conditions that determines current species' distributions. A paradigm at the time was that there were no clear biogeographical barriers in Amazonian lowlands, but I showed that soil conditions and rivers form barriers too.
3. In my first postdoc, I was dedicated to the study of biodiversity macroecological patterns. Although the ecology of land species has been extensively studied, general global distribution patterns along ecological and geographic gradients are still largely unknown. Thus, I explored the influence of macroecological traits (e.g., range sizes) in the variation of both species' niches and interaction networks along ecological gradients, considering different spatial scales and, consequently, levels of network organization (i.e., local, regional, and global). By integrating species traits and specialization measures in networks, my work identified the drivers of specialization, highlighting how species interactions, a fundamental ecological service, might be threatened by increasing anthropogenic impacts. It also allowed me to identify interaction regions or assemblages most likely to be affected by local extinctions and their subsequent co-extinctions.
4. In my second postdoc, I aimed at answering the longstanding question in ecology of whether or not species that achieve large geographic ranges also have large climatic niche breadths. To test these hypotheses, I used the information of the Botanical Information and Ecology Network (BIEN). My results suggest a spectrum of dominance, where species with extensive geographic ranges and broader climatic tolerances tend to be more abundant, an emergent macroecological pattern that can be used for understanding and predicting the impacts of climate change on species distributions, a major contribution to theory and global change biology.
5. My investigation integrates analytical frameworks of community ecology, macroecology and applied macroecology. This integration focus on evaluating and understanding large-scale patterns of species diversity and distribution, including their interactions. It holds significant potential to enhance our understanding of anthropogenic impacts on biodiversity and to develop predictive frameworks for biodiversity change in a rapidly transforming world.

Resumen del Currículum Vitae:

- 1) I am a Brazilian biologist with a deep interest in the natural world and in the anthropogenic impacts on biodiversity. My background is in botany and tropical ecology, but due to my interest in several aspects of biodiversity, I have focused my research on two main research lines: Community Ecology, Macroecology. I graduated in biological sciences at the UNESP (Brazil), obtained my MSc degree from the National Institute for Amazonian Research (INPA (Manaus, Brazil), and my PhD from the University of Turku (Finland). After my graduation, I spent four years at the Universidad Regional Amazónica Ikiam (Tena, Ecuador). After that, I completed two 2-year-long postdocs (1 in Mexico at the Instituto de Ecología, A.C. (Mexico) and another at the University of Arizona (USA [where I remained as Visiting Researcher at the Department of Ecology and Evolutionary Biology]), and currently I am in my third postdoc, again at the Instituto de Ecología, A.C. (Mexico).
- 2) I collaborated in 80 peer-reviewed scientific publications (see C2; 16 as first author and 8 as senior/correspondent author) and in one book chapter; supervised four master students (from Finland, Brazil, and the Netherlands), and collaborated/coordinated 9 projects in Brazil, Ecuador, and Mexico (see C3). Over the years, I have been Associate Editor for six journals and reviewed articles for several journals in my research area. I have my own network of collaborators in various countries of the Americas and Europe, and I am committed to impactful and collaborative research.
- 3) I had always tried to engage in activities of science popularization and diffusion. I wrote a field guide on Ferns, a biological reserve in Ecuador, and several notes to local newspapers and blogs in Ecuador and Mexico; I also organized the Reto Naturalista Tena 2019 of the Inaturalist network. The results from some publications drew the special attention of the authorities and local populations of Ecuador, being used as a technical argument against mining concessions in indigenous territories. In addition, I co-authored a book chapter titled: Rethinking the science-policy interface for the sustainable future of the Andean environment and society - learning from diversity, where we discuss how science can be used to guide policies for a better future in Latin America.
- 4) Over those years, I have taught several courses at the undergraduate, master's, and PhD levels in Finland, Ecuador, and Mexico. When at Ikiam, for instance, I had to teach on an average of 15 hours/week of classes, which made me develop solid teaching skills. During my postdocs, I co-coordinated



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

a course on Learning R and contributed with lectures to graduation courses at the Instituto de Ecología and at the Universidad Nacional Autónoma de México (UNAM, as lecturer). Four master students wrote theses under my supervision, all with scientific papers published.

5) Main skills: Ecological modelling, literature research, study design, remote sensing, field work, biodiversity data collection, vegetation, data analysis and visualization. Fluent in writing, reading, and speaking in English, Portuguese (native), and Spanish. I have strong ability to communicate complex topics to diverse audiences; Extraordinary interpersonal skills, and with experience in multicultural teamwork; I am committed to impactful, collaborative research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MORON LOPEZ, JESUS
Referencia: RYC2025-056102-I
Correo Electrónico: jesmorlop@gmail.com
Título: Harnessing Microbial Processes for Predictive Monitoring and Mitigation of Harmful Algal Blooms

Resumen de la Memoria:

My career has followed a coherent path that integrates microbial ecology, ecohydrology and environmental engineering to understand and mitigate harmful algal blooms. I began my trajectory in IMDEA Water (Spain), where my PhD research focused on microbial degradation of cyanobacterial toxins. I designed and operated a recycled-membrane biofilm reactor for microcystin removal and became corresponding author of three publications, demonstrating early scientific independence. During this stage I also initiated long-lasting collaborations with URJC and the UPM, which enabled one of the first autonomous smart buoy systems for real-time HAB monitoring in Spain and the development of machine learning tools for bloom forecasting. These collaborations remain active and continue to support my current work.

After my PhD I expanded into marine systems through a research stay in Japan, where I coordinated several coastal sampling campaigns within a nine-institution Japan-Chile consortium. I contributed to validated HAB monitoring protocols that combined microscopy, toxin analyses and sequencing and gained experience linking scientific data to operational decision-making during bloom events. I then joined the European Regional Centre for Ecohydrology in Poland, where I specialized in bacteria-cyanobacteria co-cultures and published five studies clarifying algicidal mechanisms and bloom stage sensitivity, three as corresponding author. This work strengthened my expertise in microbial interactions and ecohydrological processes shaping bloom succession.

Since 2023 at Arizona State University (ASU), I have broadened my profile through six research and development projects on nanobubbles, HABs and water treatment, securing more than one million euros as co-PI. I also initiated an independent research line on ozone nanobubbles for bloom control and contributed to two NASA-funded projects testing nanobubbles for life-support systems during parabolic flights under microgravity. These experiences consolidated my capacity to lead interdisciplinary teams and develop applied technologies.

Mentoring and teaching have been integral to my trajectory. I have supervised more than ten undergraduate and master students, contributed to the training of doctoral candidates and taught in master programmes in Spain, in the ERASMUS Mundus and currently in the Environmental Engineering programme at ASU. I have evaluated proposals for national agencies in Germany, Chile and Israel and for the European Commission and completed more than one hundred peer reviews.

My research line builds on the idea that bloom behavior must be understood at the exact moment and place where change emerges. I aim to integrate real time sensing, holobiome-informed diagnostics and nanoscale tools to reveal how extracellular vesicles and nanoparticles regulate bloom transitions. Through my Marie Curie project I develop microbial electrochemical sensors able to detect biological signals before blooms become visible. The Ramón y Cajal project will expand this framework by incorporating targeted manual sampling, metagenomics and nanoparticle analyses to capture the short windows when abiotic and biotic processes shape bloom trajectories. This integrated approach forms the basis of a long-term research vision focused on early detection, mechanistic forecasting and targeted mitigation of harmful algal blooms.

Resumen del Currículum Vitae:

My scientific trajectory combines microbial ecology, environmental engineering and smart monitoring to address harmful algal blooms (HABs). I have built a consolidated research profile with more than 23 peer-reviewed publications, ten as corresponding author, one technical book, one international patent, one registered software for smart monitoring and three patent disclosures on nanobubble technologies. My publications include five corresponding author papers on algicidal mechanisms and bloom succession, three corresponding author papers on machine learning tools for HAB prediction and several first author studies on biofilm reactors and nanobubbles. I have presented my work at more than twenty conferences, seven with the role of speaker, reflecting visibility in the field. My early contributions were recognized with the Extraordinary Doctorate Prize in Science from the University of Alcalá.

I have demonstrated sustained capacity to attract competitive funding and lead research. During the last three years at Arizona State University (ASU), I have secured more than one million euros as co-PI through six R&D projects funded by federal agencies and industrial partners. Earlier in Spain, I contributed to national projects that delivered the first autonomous smart buoy system for HAB monitoring in the country and a deep learning forecasting platform. I also hold a Marie Curie Fellowship that I designed and lead between Spain and the United States and have participated in two NASA funded projects evaluating nanobubbles for life support systems, including experimental validation during parabolic flights.

My trajectory is strongly international. I have completed research stays in Spain, Japan, Chile, Poland and the United States and collaborated with more than seventy institutions across ten countries. In Japan I coordinated coastal sampling campaigns within a nine-institution consortium and co-developed HAB monitoring protocols validated in Chilean waters. In Poland I specialized in bacteria cyanobacteria co cultures and published five studies clarifying algicidal activity and bloom stage sensitivity, three as corresponding author. At ASU I expanded my expertise across nanobubbles, membrane processes, HABs and water treatment within a multidisciplinary team of more than twenty researchers.

Mentoring, teaching and scientific service constitute an important part of my CV. I have supervised more than ten undergraduate and master students and contributed to the training of doctoral candidates through laboratory guidance, project supervision and dissertation committees. I have taught in master programmes in Spain, lectured in the ERASMUS Mundus and currently teach in the Environmental Engineering programme at ASU. I have evaluated proposals for national agencies in Germany, Chile and Israel as well as for the European Commission and have completed more than one hundred peer reviews for high impact journals. Together these activities demonstrate a mature scientific profile, a sustained record of leadership and a strong capacity to contribute to the Spanish research system.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: EMER, CARINE
Referencia: RYC2025-054537-I
Correo Electrónico: c.emer09@gmail.com
Título: SESNET - Socioecological Networks in tropical forests: food security, ecosystem services and biodiversity conservation

Resumen de la Memoria:

Humanity faces urgent challenges to deal with the overexploitation of natural resources, food insecurity, and biodiversity loss. Traditional societies manage a wide diversity of resources, while modern systems depend on few species to sustain the global food chain. The sustainability of these systems depends on the interconnectedness among ecological, social, economic, and political processes. This proposal investigates the structure and resilience of socio-ecological systems (SES) using traditional knowledge and ecological network theory, connecting biodiversity, food security, and human well-being. The main objectives are (1) Optimize and expand the co-management zoning for pirarucu fishing in the Amazon; (2) Define sustainability limits for açai extractivism; (3) Develop new methods and models for tropical ecology studies in megadiverse systems. Study sites are at the Middle Juruá, Western Brazilian Amazon, and is grounded on a established partnership with a local institution (Juruá Institute), data collected from a previous edition, the proponent expertise and a solid network of collaborators. This proposal will promote interdisciplinary integration, providing scientific support for the sustainable use of natural resources and promoting internationalization, outreach and societal returns within networks of research excellence. It is aligned with ONU ODS for the 2030 Agenda and contributes to the transition from the current model to a nature-positive economy.

Resumen del Currículum Vitae:

A highly accomplished and dedicated Brazilian/Italian researcher with a solid and recognized background in ecology and conservation, strong focus on species interactions, ecological networks, and the impacts of anthropogenic disturbance in ecosystem functioning. With more than 17 years of experience in research, a solid research experience in many ecosystems around the world, and a proven record of translating complex science into actionable conservation strategies, my career has been dedicated to understanding and mitigating human impacts on biodiversity. My work focuses on the complexity of ecological interactions and how they respond to human-driven environmental change. I integrate network ecology, evolutionary thinking, natural history, biology, advanced technology and statistical tools to understand how biodiversity and people are adapting to the Anthropocene. My main findings are related to human-made disturbances (e.g. deforestation, fragmentation, defaunation, invasive species) impacts on ecological processes (e.g., pollination, seed dispersal, herbivory) at multiple temporal and spatial scales, and the consequences for conservation planning and policies.

I am currently a Young Research Fellow at Rio de Janeiro Botanical Garden, leading a 4y-project granted by FAPERJ on socioecological systems, nature-based solutions, traditional/academic knowledge chains, and the sustainable use of natural resources in tropical forests. I hold a Ph.D. in Biological Sciences from the University of Bristol (UK), a Master's in Ecology from the National Institute for Amazonian Research (BR), and a Community Development and Intercultural Relationship diploma from Cégep Marie-Victorin/Jeunesse Canada Monde (CA). Large experience in field work, last generation data analyses, teaching, securing funding, and science communication. Proven ability to lead interdisciplinary research projects, networking, mastering academic courses, supervise students, and outreach.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: BULIAN, FRANCESCA
Referencia: RYC2025-055185-I
Correo Electrónico: f.bulian@rug.nl
Título: Microfossil Archives of Change: Mediterranean Sea Evolution and Paleoclimate Reconstruction

Resumen de la Memoria:

Over the next few years, I aim to pursue research that examines how marine ecosystems respond to environmental extremes, with a focus on the interplay between biotic change, ocean circulation, and sea-level variability across critical transitions in Earth's history. My approach integrates micropalaeontological data—particularly benthic and planktonic foraminifera—with stable isotope geochemistry, XRF core scanning, and statistical analysis to link microfossil evidence with climatic and geochemical signals.

As a member of the onshore science team for IODP Expedition 401 and co-coordinator of Working Group 1 (Biota) within the COST Action SaltAges, much of my current work centres on newly recovered cores from the West Alboran Basin, the first continuous record of the Messinian Salinity Crisis (MSC). Building on my previous studies of Alboran Sea sequences, I use foraminiferal taxonomy, $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ analysis, and astronomical tuning to reconstruct ecological and oceanographic changes before, during, and after restriction of the Gibraltar gateway. A central goal is to understand benthic oxygenation, test dwarfism, and carbonate chemistry using assemblage composition and geochemical proxies. I plan to expand this work using micro-CT scanning, morphometrics, and test-thickness measurements to quantify calcification and evolutionary responses to environmental stress. These methods will reveal how marine biota adapted or failed to adapt to extreme conditions. Beyond the Mediterranean, I aim to apply this approach to other evaporative and semi-enclosed basins.

I am also strongly interested in recovery processes following environmental crises, particularly the early Zanclean reflooding of the Mediterranean. I plan to develop new stable isotope records and analyse biotic turnover across the Messinian–Zanclean transition, integrating field sections and IODP core materials. Working with the SaltAges network, I aim to better constrain the timing, pace, and ecological dynamics of this major recovery phase.

In parallel, I am continuing my research on Quaternary sea-level change and coastal evolution along the Tyrrhenian coast of Italy. Using foraminiferal assemblages, stable isotopes, $^{40}\text{Ar}/^{39}\text{Ar}$ dating, and field stratigraphy, I reconstruct the development of marine terraces and palaeodeltas that record glacio-eustatic cycles over the last 125,000 years. In collaboration with INGV Rome, I am refining terrace chronologies and integrating geochronological and paleoenvironmental data to improve high-resolution reconstructions of Quaternary sea levels. Future work will extend these studies southwards to the Fondi and Gaeta basins.

I also plan to further develop my research on late Holocene coastal paleoenvironments and human-environment interactions, particularly in ancient salt-production landscapes. My work in the Ostia palaeolagoon reconstructs environmental change and anthropogenic modification using microfossils, sedimentology, and radiocarbon dating. A key objective is to evaluate the reservoir effect by dating multiple materials within the same stratigraphic layers. This research will be expanded to other Italian palaeolagoons in collaboration with the CIO in Groningen.

My long-term goal is to build an integrated research program that investigates biotic responses to environmental extremes, focusing on evolutionary and ecological dynamics during salinity c

Resumen del Currículum Vitae:

My research focuses on how marine systems respond to environmental change, integrating benthic and planktonic foraminifera, stable isotope geochemistry, and sediment analysis. I began this work during my PhD within the SaltGiant Project (ETN, Horizon 2020), completed at the University of Salamanca and awarded the Premio extraordinario de doctorado in 2022. Since 2018, I have published 26 peer-reviewed papers, seven of them in 2025. Using statistical approaches and $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ analyses, I reconstructed water-mass circulation, oxygenation, and palaeobathymetry in the Mediterranean during the transition from isolation to reconnection with the global ocean. This work advanced understanding of the Messinian Salinity Crisis (MSC) and its aftermath, including contributions to a recent Science Advances paper on the climatic and hydrological controls on the end of the MSC.

Because of my expertise on the MSC, I served on the core writing team of the COST Action SaltAges (CA23124), which obtained EU funding, and I now co-lead Working Group 1, focusing on climatic and biological impacts of marine gateway reconfiguration. My role as an onshore scientist in IODP Expedition 401 (Mediterranean–Atlantic Gateway Exchange) has allowed me to extend this research using newly recovered cores from the Alboran Basin and Gulf of Cadiz. These materials provide the first continuous MSC record from the western Mediterranean and are central to my ongoing work on how gateway restrictions influenced circulation and benthic ecosystems. Recent publications in Science and Science Advances highlight my contributions to understanding benthic foraminiferal responses to environmental thresholds.

In parallel, through a NWO-funded postdoc at the University of Groningen, I investigate Quaternary sea-level fluctuations and coastal evolution along the Tyrrhenian margin of Italy. Using foraminiferal assemblages, stable isotopes, ^{83}O and $^{83}\text{O}/^{37}\text{Ar}$ dating, and field stratigraphy, I reconstruct marine terraces and paleodeltas shaped by glacio-eustatic cycles over the last 125,000 years. These archives provide case studies for assessing ecological resilience and improving predictive models of coastal change. My long-term goal is to develop an integrated program examining biotic responses to environmental extremes, expanding beyond foraminifera to include ostracods, mollusks, and nannofossils, and applying multivariate and ecological modeling approaches.

As part of the Salt and Power project, I also study late Holocene coastal paleoenvironments associated with ancient salt production. Working closely with archaeologists, I explore how early societies adapted to dynamic deltaic landscapes and modified their environment to sustain production. Our ongoing work in the Ostia palaeolagoon reconstructs environmental change and human intervention through microfossil, sedimentological, and radiocarbon analyses. This research fostered a collaboration with the Istituto Nazionale di Geofisica e Vulcanologia (INGV), where I gained experience in ^{83}O and $^{83}\text{O}/^{37}\text{Ar}$ dating, a key tool for chronostratigraphic reconstruction of marine terraces. By integrating micropalaeontological, geochemical, and geological data, my work bridges the Neogene, Quaternary, and Holocene, connecting natural processes and human-environment interaction in coastal systems.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: LÓPEZ RIVAS, MARGARITA
Referencia: RYC2025-056789-I
Correo Electrónico: mlrivas@uca.es
Título: ECOLOGY AND CONSERVATION OF MARINE VERTEBRATES.

Resumen de la Memoria:

My main aim is to identify and understand the anthropogenic impacts—such as global warming and marine pollution—on marine biodiversity at a global scale. This knowledge will enable the identification of new conservation areas and the implementation of management measures to protect these enigmatic animals, a goal of great importance given the current climate and ecological crisis. Specifically, I focus on studying the effects of climate change and plastic pollution on marine vertebrates, while leveraging artificial intelligence and open-access software as tools for megafauna conservation. Plastic pollution, for instance, represents a pervasive and growing threat to the marine environment. Marine vertebrates are particularly vulnerable, with projections indicating that over 99% of these species will be affected by 2050. Therefore, it is essential to study how plastics accumulate in the marine food web and in iconic species, including apex consumers such as cetaceans, seabirds, sea turtles, and both pelagic and benthic fish of commercial interest. Additionally, I investigate the presence of PFAS, heavy metals, and plastic additives in these species through the quantification and characterization of ingested plastics and contaminants. The findings aim to advance our understanding of the mechanisms affecting large predators and to identify species that can serve as ecosystem indicators of plastic pollution. Ultimately, this research seeks to assess the potential impact of contaminants on marine species and human well-being, with significant global relevance, as this proposal will conduct the first comprehensive assessment of pollution impact on the marine food web. I also aim to translate these findings into science-based policy recommendations and to develop educational outreach tools to increase public awareness. To achieve these goals, I collaborate with a multidisciplinary team of chemists, ecologists, technology specialists, and managers from national and international universities and institutions, investigating how plastics are distributed across the marine food web and how this affects marine biodiversity, ecosystem health, and human welfare.

5.2. General objective. The RyC grant would allow me to establish myself as a consolidated and leading researcher and to develop my objectives, which include: 1. Creating a research lab focused on marine megafauna conservation, integrating ecological monitoring, artificial intelligence, and open-science tools. 2. Launching a long-term research programme on the impacts of anthropogenic threats on marine vertebrate populations at regional and global scales. Applying for national and European research calls to establish a consistent predoctoral and postdoctoral team. 3. Developing innovative methodologies using open-access software, remote sensing, and IA techniques to improve species detection, monitoring, and management. 4. Strengthening international collaborations with research institutions, conservation agencies, and NGOs to enhance knowledge transfer and promote evidence-based decision-making. 5. Training and mentoring young researchers by supervising MSc and PhD students and promoting an inclusive, interdisciplinary research environment. 6. Expanding outreach and science communication efforts to increase public awareness and contribute to policy development in marine biodiversity conservation.

Resumen del Currículum Vitae:

Over the past 20 years, I have led different research projects in several Latin American countries, including Chile, Costa Rica, Panama, Ecuador, Colombia, Trinidad y Tobago and Cuba. My role as a scientific coordinator in those projects has allowed me to implement new research projects and collaborations with over than 300 scientists and institutions internationally. In addition, my stays at eight different foreign universities have allowed me to develop new teaching skills and work in global multidisciplinary teams. As consequence I have got the R3 certification and Titular Professor accreditation.

My experience has focused on:

(1) Knowledge on marine vertebrate ecology and the threats they face. This includes lab experiments and field work (35 articles and book chapters + 8 currently under review). All published are in within the JCR index, in mainly Q1 SCI-journals with an h-index: 16; Total citations: 2850 on Google Scholar. 9 articles were published in top D1 journals such as Global Change Biology (IF=13.2; 1/65, Biodiversity Conservation) and J. of Hazardous materials (IF=12.4, 3/83, Environmental category). These articles present methodological advances in global assessment of climate change and marine pollution effects on sea turtle, cetaceans, fish and seabird species and populations.

(2) Extensive experience in data analysis, including mathematical modelling and big data, with over 300+ hours of teaching at the University of Cádiz and 250+ at the undergraduate and International Master in Biodiversity Conservation and Biology degree at Marta Abreu de las Villas, Cuba. Currently, I am supervising PhD students (4), and supervised 1Phd, TFMs and TFGs (13).

(3) Extensive experience presenting scientific results presentations at conferences (50+), seminars and outreach events (40+) as well as participation in the Women's Leadership in the Fight Against Climate Change project (Homeward Bound). I was part of an expedition to Antarctica in December 2023, involving nearly 200 scientists and networking more than 500 globally.

(4) Leadership, as PI I have led national projects (2) supported by Fundación Biodiversidad and FEMP projects (2) of the Junta de Andalucía in the last 5 years. Additionally, I was the IP at UCA for the LIFE European Union project titled "Seabil- Saving sea birds from marine litter", in collaboration with SEO, LPO of France, and SPEA of Portugal. This project is endowed with over 1 million euros, and I have participated as PI and collaborator at (14) and I received 2-year leadership training in Homeward Bound, developing projects with a grant of 30.000 €.

(5) Prizes (4), 2025, Prize de divulgación científica, Información: Expertos UCA.

Universidad de Cádiz. 2025, Prize Mujeres Científicas Porcia Maura. Almería, 5 de enero 2025. 2024, Prize Mujeres Científicas en la categoría de BIOLOGÍA. Science Fest. Revista Muy Interesante. Málaga, 2024. 2023, Premio Duna a personas e instituciones que han destacado por su compromiso con el medio ambiente. Grupo Ecologista Mediterráneo.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MARTÍNEZ NÚÑEZ, CARLOS
Referencia: RYC2025-055666-I
Correo Electrónico: carliyo_89@hotmail.com
Título: Ecología de artrópodos en paisajes agrícolas

Resumen de la Memoria:

My scientific trajectory has been guided by a central question: how global change drivers reconfigure biodiversity and ecological interactions, and what this means for the conservation, sustainability and the provision of ecosystem services, mainly in agroecosystems. My main work sits at the interface of community ecology, trait-based ecology, and agroecology, combining field studies, ecological network analysis, and large-scale modelling. During my PhD, I investigated how agricultural intensification and landscape complexity shape species distributions, functional diversity, and ecosystem services in Mediterranean olive groves. This work, supported by international research stays and published in leading journals, strengthened my expertise in biodiversity assessment, plant-pollinator and predator-prey networks, and the functional evaluation of ecological communities. My international postdoctoral experience at Agroscope (Switzerland) allowed me to incorporate a long-term perspective, analysing how decades of land-use change have altered arthropod traits and ecosystem functioning. Later, as a Juan de la Cierva Fellow and researcher at the Estación Biológica de Doñana (CSIC), I expanded my conceptual and spatial scope to regional and global scales, examining how landscape structure, climate, and evolutionary history jointly shape bird and pollinator diversity, interaction networks, and functional trait patterns. My current research line integrates multiscale ecological data, functional traits, and advanced modelling frameworks to identify the mechanisms underpinning community resilience and to develop actionable tools for pollinator conservation, land-use planning, and the transition toward biodiversity-friendly agricultural landscapes. My research programme for the coming years will integrate trait-based ecology, biodiversity monitoring, and predictive modelling to develop scalable frameworks for understanding how land-use change and agricultural practices reshape ecological communities. This research will provide practical insights to promote biodiversity-friendly management at multiple spatial scales, contributing to European and global conservation goals.

Resumen del Currículum Vitae:

I am a community ecologist studying how global change alters species' spatial and temporal distributions, functional traits, biotic interactions, and ultimately ecosystem functioning. My long-term goal is to generate actionable ecological knowledge that supports biodiversity conservation and sustainable agricultural landscapes. I completed an international PhD at the University of Jaén, examining how agricultural intensification and landscape complexity shape biodiversity and ecosystem services in Mediterranean olive farms, resulting in nine first-author papers and two international research stays. I then pursued an international postdoctoral fellowship at Agroscope (Switzerland) on long-term agricultural impacts on arthropod traits, followed by Juan de la Cierva and Junta de Andalucía Postdoctoral Fellowships at the Estación Biológica de Doñana (CSIC), where I am developing independent research lines across large spatial and temporal scales. Over the past three years, I have published widely in leading journals (e.g., Nature Communications, Nature Sustainability, Nature Ecology & Evolution, Ecology Letters), contributing to trait-based ecology and pollinator conservation. I have authored 37 peer-reviewed papers (16 first-author, 5 senior-author), a book chapter, and my work has accrued >830 citations (h-index 17). Beyond metrics, my research is integrated into international networks and applied in biodiversity monitoring and agroecology initiatives. I contribute to major European projects (H2020 SHOWCASE, H2020 SAFEGUARD, Biodiversa+ ANTENNA), and I have secured >323,000 € in competitive personal funding, including five national and international grants and two small independently led projects (about 20,000 € in total). I serve as Associate Editor for Ecological Applications and Insect Conservation and Diversity, and review regularly for top journals. I have supervised two PhD theses (one completed), seven Master's theses, a JAE-intro fellow, an international visiting researcher, and an undergraduate student. Mentoring and supporting early-career scientists is now a core part of my academic trajectory.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: DEL ÁGUILA PÉREZ, ANA
Referencia: RYC2025-054688-I
Correo Electrónico: anadelaguilap@gmail.com
Título: Artificial Intelligence for Advancing Atmospheric Remote Sensing

Resumen de la Memoria:

I am a multidisciplinary researcher in atmospheric remote sensing and AI, combining expertise in lidar technologies, satellite retrieval algorithms and radiative transfer modelling. My scientific career focuses on a) developing AI methodologies for atmospheric target classification, b) designing novel AI retrieval algorithms for Earth Observation satellites and c) transferring these advances to operational level for European research infrastructures and satellite missions.

My key scientific achievements include: a) developing the first computer-vision framework for lidar image segmentation, b) implementing ML-based aerosol type classifiers across ACTRIS/EARLINET stations, c) integrating the ice-cloud retrieval module for Copernicus Sentinel-5P and Sentinel-4 missions, and d) designing acceleration techniques for radiative transfer methods that enhance aerosol and trace gases retrievals of hyperspectral satellite sensors.

I have demonstrated a strong capacity to attract competitive funding, securing more than €420k throughout my career. I obtained highly competitive grants and projects as sole Principal Investigator (PI) such as a) Juan de la Cierva postdoctoral fellowship (99.2/100, 2023), b) a National Project (DeepAtmo, 2024) to apply deep learning to ground-based lidar for target classification, c) Beca Leonardo from Fundación BBVA (success rate ~4%, 2025) to develop AI-based air-quality index forecasting for major Spanish cities, and d) co-PI for ESA EarthCARE Cal/Val project. This funding has allowed me to establish the AI4ATMOS research line at the University of Granada, where I have initiated a research group by hiring two researchers and supervising a PhD student.

I have a strong international profile, including research experience in an European research infrastructure LifeWatch-ERIC (15 months) and extended experience in prestigious institutions such as (i) the German Aerospace Center (DLR) for 3-years, where I obtained my PhD with *Summa Cum Laude*, and a subsequent Postdoc (14 months), where I implemented new physical parametrizations for atmospheric retrievals for Sentinel-5P/S4 Copernicus missions in coordination with ESA, KNMI, BIRA and partners; ii) MeteoSwiss (3-months), to develop a deep learning algorithm for hydrometeor classification on the EUMETNET E-PROFILE network (>400 ceilometers over Europe); and (iii) Évora ACTRIS/EARLINET station (Portugal) for 3-months.

I have published 20 peer-reviewed articles (12-first author; 368 citations; h-index 10), contributed to more than 60 international conferences, and participated in 17 national and international research projects. I supervise two contracted researchers and one PhD student, and have supervised three MSc theses (with honors) and two BSc theses at University of Granada.

The primary goal of my future research line will be to develop next-generation AI methodologies for lidar technology and satellite remote sensing, integrating physics-informed deep learning and advanced machine learning for aerosol and cloud retrievals into near-real-time processing pipelines. These developments will enhance aerosol and cloud characterization, support Cal/Val activities for missions such as EarthCARE, Sentinel-5P and Sentinel-4. The research will reduce key uncertainties in climate assessments, improve air quality monitoring and support current and future missions.

Resumen del Currículum Vitae:

I am a postdoctoral researcher and Principal Investigator (PI) leading the AI4ATMOS research line on artificial intelligence for atmospheric remote sensing. After completing a highly competitive Juan de la Cierva fellowship (2023-2025), I have consolidated an independent trajectory through competitive funding as sole PI (National Plan DeepAtmo project, BBVA Leonardo grant) and co-PI (ESA EarthCARE Cal/Val), securing over €420k and establishing a team with two researchers and one PhD student.

Scientific and technical contributions: I have 20 peer-reviewed publications (12 first-author; 12 JCR Q1), 368 citations and h-index 10. My research combines atmospheric remote sensing, radiative transfer modelling and AI. Early in my career I worked for two years at INTA-El Arenosillo under a competitive *Garantía Juvenil* contract, contributing to aerosol characterization and lidar P-MPL/NASA research. I obtained my PhD with *Summa Cum Laude* at the Technical University of Munich and the Earth Observation Center at the German Aerospace Center (DLR), where I developed fast radiative transfer methods based on machine learning techniques for aerosol and trace gases retrieval algorithms. As postdoctoral researcher at the Atmospheric Processors Department of DLR, I translated these advances into operational Copernicus algorithms, leading the integration of ice-cloud retrievals for Sentinel-5P/S4 and contributing to surface-reflectance and aerosol products with ESA and other partners. In 2023 I was awarded a Juan de la Cierva fellowship at the University of Granada and obtained funding for several competitive projects as sole PI, which helped me establish the AI4ATMOS research line, supervising 2 contracted researchers and leading the first deep-learning study for lidar image segmentation as well as designing ML frameworks for target classification and aerosol typing now applied within ACTRIS/EARLINET and EarthCARE validation.

Internationalization and mobility: I carried out my PhD (3-years) and a subsequent independent postdoc at DLR (14 months) in Germany, working on mission-driven algorithm development for European satellite retrievals. I then joined the European Research Infrastructure LifeWatch ERIC for a 15-month postdoc in Data Science and AI, where I coordinated a bridging meeting among LifeWatch-ERIC, ACTRIS-ERIC and LALINET, and contributed to the PLATERO nanosatellite with OPEN COSMOS (UK). In 2025 two international secondments further strengthened my network: MeteoSwiss (E-PROFILE network) in Switzerland and the ACTRIS/EARLINET station of Évora (Portugal).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

☑Leadership: I am PI of four projects and co-PI of an ESA Cal/Val project, have participated in 17 research projects and contributed to over 60 international conferences. I lead AI4ATMOS and supervise two researchers and one PhD student. I have supervised several BSc and MSc theses (with honors) and a research internship. I have delivered 270 teaching hours and been invited lecturer in doctoral and training schools. I serve on the Editorial Board of Discover Atmosphere, act as evaluator of national projects for the AEI, review more than 25 manuscripts for journals, and hold ANECA accreditation as ☑Profesor Contratado Doctor☑. I participate in ACTRIS/EARLINET, E-PROFILE and COST Actions, and maintain strong engagement in outreach, with my most recent event reaching over 32,000 viewers.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: ARIAS MARTORELL, JULIA
Referencia: RYC2025-056354-I
Correo Electrónico: julia.arias@icp.cat
Título: Evolution of locomotion and posture in hominoids: morphological and biomechanical insight into homoplasy, specialization and arboreality

Resumen de la Memoria:

I am a paleoanthropologist specialized in hominoid paleobiology. I am interested in the evolution of locomotion and posture, including the origins, specialization and diversification of locomotor behaviors of catarrhine primates, with emphasis on the origins of the upright posture and bipedalism. I use innovative 3D biomedical and engineering techniques to analyze the internal and external bone morphology of extant and fossil apes' forelimb and spine. I combine internal and external bone analyses by applying three-dimensional geometric morphometric techniques (3DGM) and characterizing the trabecular (mesh-like) and cortical bone response to mechanical loading (i.e., forces applied to the bone derived from locomotor activities). I incorporate in my evolutionary analyses the Miocene apes (distant relatives of apes from the Miocene Epoch [23–5 Million years ago]) alongside the hominin fossil record, and I use a broad comparative morphological framework that includes humans, living apes, and other primates (including Old and New World monkeys). Importantly, I include soft-tissue-based analyses (anatomical dissections, and motor protein analyses) in order to obtain holistic morphological and functional models of locomotion throughout ape and human evolution. This allows me to undertake more complete and nuanced functional and adaptive characterizations of the hominin skeleton, and to tackle big questions in human evolution with a deep-time component, such as the origins of bipedalism, which is thought to have occurred during the Late Miocene (ca. 8–5 Ma) in an unknown hominin ancestor.

After obtaining my Master's in Human Biology (2010), I conducted my PhD in Biology (2014), fully funded by the University of Barcelona, on the external morphology of the glenohumeral (shoulder) joint using three-dimensional geometric morphometric (3DGM) techniques, which I introduced to my research group. After completing my PhD, I was awarded a Marie Skłodowska-Curie Individual Fellowship at the University of Kent, UK (2016–2019) to explore Miocene ape locomotion via the application of innovative analysis of internal bone structure. While at Kent, I was awarded a SAC Research Grant (2017) to further support this research. In September 2017 I went on maternity leave (twins) for 9 months and came back to work part time for the remainder of my MSCA. I was awarded a Beatriz de Pinós' MSCA COFUND fellowship at ICP (2020–2023) to continue working on the internal morphology of bones of Miocene apes and introduce this innovative technique to Spain. I am now a researcher at ICP working on external and internal Miocene ape and catarrhine bone morphology. I obtained a José Castillejo mobility grant (2024) to conduct a research stay at the University of Kyoto (Jun–Aug 2025) and, additionally, I have conducted several short (1 to 4 weeks) research stays (>10) in institutions world-wide, including the Max Planck Institute and the Kenya National Museum, where I was a Fellow (2022).

Resumen del Currículum Vitae:

I have 41 publications, including 26 articles in indexed (JRC) journals, plus book chapters, conference abstracts in indexed journals, and anatomical atlases on ape anatomy (Springer) which were published in collaboration with an international team of researchers with whom I co-founded the Bonobo Morphology Initiative in 2016. All my first- and sole-authored indexed articles are published in Q1 journals, including the top journals of my field (e.g., Journal of Human Evolution) and multidisciplinary journals (e.g., iScience). Additionally, I have authored >10 technical reports on fieldwork campaigns, as well as many abstracts in non-indexed publications. I have 501 citations and an H index of 14. I am PI2 of the AEI-funded project PrimatePalEvol (2025–29; PID2024-159434NB-I00), and of the past project Primevol (2021–25; PID2020-116908GB-I00), both nearing 200,000 € in funds. Over the years, I have participated in eight major research grants by AEI and Generalitat de Catalunya, and as a postdoctoral research associate in two ERC grants (StG GRASP and CoG NewHuman), all in which I lead research lines. I hold the R3 Certificate (2023) from AEI, which identifies me as an established researcher, a leader in my field and future group leader within my institution. I have participated in >30 national and international conferences, seminars, talks and invited talks, including the top conferences in my field, where I have been repeatedly invited as session Chair. Most recently, I contributed to the symposium in honor of Prof. Terry Harrison, a world-renowned paleoanthropologist, at the American Association of Biological Anthropologists Meeting (Baltimore, Mar 2025). I was part of the scientific committee of the NOW 25th Anniversary meeting (Nov 2022) and the Organizing Committee of the 20th European Association of Vertebrate Paleontology Meeting (Jul 2023). I have extensive experience in paleontological fieldwork in Europe and Africa, and as director of fossil ape-bearing localities of the Vallès-Penedès basin (e.g., Creu de Conill 20, 2025). I teach in the MSc in Biological Anthropology (UB-UAB) and the MSc in Paleobiology and Fossil Record (UAB) since 2021, and I am module coordinator (Fossil Primates and Human Evolution, 2023) in the latter. I have supervised six master's theses (2021–24) and I am currently supervising two PhD students and a master's theses. I have participated in numerous outreach activities; most recently (15/11/2025), I was interviewed in a special radio program of 'Fenòmens Naturals' for the 2025 Science Week. I am the author of the popular science book 'Homo floresiensis. Los efectos de evolucionar en una isla', from the collection 'Biblioteca Evolución Humana' (Salvat, 2023). I am a peer-reviewer for several JRC journals, and an expert panelist for the MSCA-PF program and the Leakey Foundation. I was an Associate Editor (i.e., handling editor) of the Journal of Human Evolution (2023–24) and currently a Guest Editor at Journal of Mammalian Evolution (2025–current).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: PERALTA MARAVER, IGNACIO
Referencia: RYC2025-056517-I
Correo Electrónico: peraltamaraver@ugr.es
Título: A unifying framework integrating laboratory experiments with field records to predict the response of ectotherms to global warming

Resumen de la Memoria:

My research line aims to establish a unifying mechanistic framework integrating laboratory experiments with field thermal variability to predict ectotherm responses to global warming. With the Ramón y Cajal fellowship, I will consolidate an independent research line addressing this challenge from a macroecological perspective, using large datasets, global species distributions and comparative approaches across diverse taxonomic groups (sharks, corals, insects, reptiles and amphibians).

Global warming poses a major threat to ectotherms, whose fitness and survival depend strongly on temperature. Despite extensive laboratory work quantifying thermal limits, current predictions remain unreliable because traditional protocols cannot be scaled to the fluctuating environments organisms experience in nature. This gap of knowledge results from the lack of integrative analytical frameworks linking physiology, ecology and environmental variability.

Over the past five years, my collaborators and I have developed two complementary frameworks: Thermal Tolerance Landscapes (TTL) and the Universal Thermal Performance Curve (UTPC) which unify thermal tolerance and performance measurements across the tree of life and across levels of biological organisation. These tools have generated key advances in understanding body-size scaling of heat tolerance, local adaptation along climatic gradients, and performance unification across biological levels, with outputs published in high-impact journals.

However, several challenges limit broader adoption: analytical methods remain technically demanding; empirical tolerance landscapes are scarce; geographic and taxonomic patterns of heat tolerance are still poorly quantified; and current frameworks focus solely on temperature, ignoring synergistic stressors such as desiccation, oxygen limitation and pollution. Moreover, the selective pressures shaping cross-lineage variation in thermal tolerance remain unresolved.

My future research line will address these gaps through four objectives: (1) reconstruct global variation in heat tolerance using the TTL framework and identify its physiological determinants; (2) quantify how thermal tolerance influences species distributions, community structure and vulnerability to warming; (3) expand TTL and UTPC to incorporate additional stressors affecting resilience; and (4) develop an open-source R package to facilitate implementation of these approaches by the scientific community. Also, my research line will be strengthened by international collaborations, including predictive models of thermal responses for fishes and sharks with Trinity College Dublin, and mechanistic models forecasting coral bleaching at global scales with the Australian Institute of Marine Science. I also plan to establish a laboratory in Spain to combine experimental and theoretical work on terrestrial ectotherms under multiple interacting stressors.

The expected impact includes the development of a unifying mechanistic framework in ecophysiology, new analytical and computational tools, improved conservation strategies through mechanistic vulnerability assessments, enhanced climate-change forecasting and greater societal and policy relevance through open-access dissemination and evidence-based environmental guidance.

Resumen del Currículum Vitae:

I present a strong and internationally consolidated research trajectory, supported by 8 years of experience abroad, an R3 research accreditation, and five postdoctoral contracts obtained through highly competitive programmes. My scientific output includes 32 SCI articles, 21 as first, last or corresponding author, accumulating 889 citations and an h-index of 14 (Google Scholar). I have recently been appointed Associate Editor of Functional Ecology (starting 2026) and I have acted as an anonymous reviewer for 78 scientific articles and for national research proposals from Chile.

I completed my PhD at the University of Roehampton (London, 2015–2018) funded by a Marie Skłodowska-Curie ITN, with long-term secondments in the UK, Germany, Israel and Brazil. In 2019 I obtained a Newton Fund postdoctoral fellowship in the University of Roehampton, and I was subsequently hired as Associate Professor in the same institution. In 2020 I returned to Spain with a Juan de la Cierva Formación fellowship that I replaced in 2021 by a postdoctoral contract from la Junta de Andalucía. In 2023, I was awarded a Marie Skłodowska-Curie Global Fellowship, enabling research stays in Chile, Australia, the Netherlands and the UK.

My research has evolved from community ecology to ecosystem ecology and, more recently, to eco-physiology and global-change biology. I have contributed methodological and conceptual advances to the understanding of thermal tolerance across the tree of life, including body-size scaling of heat limits, the unification of thermal performance across biological levels, and mechanistic predictions of species responses to warming. These contributions have been published in leading journals such as Nature Climate Change, PNAS, Global Change Biology, Ecology Letters, Journal of Animal Ecology, and Proceedings B. All datasets and code of my research are openly accessible.

I have demonstrated leadership by coordinating two early-career projects as PI including my ongoing MSCA Global Fellowship and by organising international events such as the International Symposium on Predictive Ecology in a Warming World (Granada 2025), now held annually. I also lead a global research network on predictive ecology involving internationally recognised experts (e.g. Bates, Araújo, Santos, Atkinson, Deutsch, Ghalambor, Ellers). In addition, I co-develop early-warning tools for coral bleaching with the Australian Institute of Marine Science.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My record of knowledge transfer includes collaborations with environmental consultancies (Hydraena, DNota), contributions to water-quality monitoring reports for Thames Water (UK), and outreach pieces published in The Conversation and Ecomandanga. I have supervised 11 undergraduate dissertations, 2 MSc theses, 1 PhD thesis, and currently supervise a doctoral student. My teaching experience exceeds 500 accredited hours, fully recognised by ANECA.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: ESCOLÀ CASAS, MÒNICA
Referencia: RYC2025-055655-I
Correo Electrónico: mescola28@gmail.com
Título: Non-Target and metabolomics analytical strategies to develop sustainable quaternary wastewater treatment solutions

Resumen de la Memoria:

My research trajectory allowed me to develop expertise in wastewater treatment technologies to remove organic micropollutants. My PhD at Aarhus University (Denmark) established my foundation in biofilm systems, particularly Moving Bed Biofilm Reactors (MBBRs), leading to key collaborative papers with DTU and Anoxkaldnes (Sweden). Later on I went into the private sector at MS-Omics (Denmark), where I gained valuable expertise in metabolomics workflows and industry-oriented research. In 2019, I returned to Spain to join the Institut Català de Recerca de l'Aigua (SCOREwater project). There, I used my knowledge on analytical chemistry and wastewater to perform the first study of the group on sewage epidemiology. I achieved independence in 2020 through the Beatriu de Pinós (BP) grant (Marie Curie COFUND) at IDAEA-CSIC. With the BP grant I pioneered the use of metabolomics to study root-exudate dynamics, which could improve Nature-Based Solutions (NBS) performance to remove micropollutants. I now lead an independent research unit, successfully incorporating metabolomics and non-target strategies to evaluate wastewater treatment performance. This research line is sustained by strong international project participation (e.g., UPWATER, PROMISCES) and crucial knowledge-transfer contracts with private industry (e.g., AstraZeneca), confirming my research leadership, collaborative network, and global impact potential. The new EU Urban Wastewater Treatment Directive (2024/3019), approved in November 2024, mandates the widespread implementation of quaternary treatment across many wastewater treatment plants Europe to remove ubiquitous micropollutants. This creates an urgent need for cost-effective, high-efficiency technologies, which is the focus of this research line. Conventional treatment assessment relies on target analysis (lists of known compounds), which provides an incomplete evaluation by ignoring non-targeted compounds. To provide a more comprehensive assessment, this research adopts a High-Resolution Mass Spectrometry non-target analysis strategy. This method captures the entire chemical profile (features) and enables a rigorous evaluation of treatment efficiency based on the overall reduction of chemical complexity, independent of specific compound identification. On the other hand, metabolomics studies (based on non-target analysis) have previously demonstrated that crop stress patterns arise before observable toxic effects from pollutants. This strategy will be further developed to relate water pollution to modifications in the crop's metabolome, ensuring safety upon water reclamation. This research line will then pursue a dual objective using my unique background in wastewater and metabolomics: 1) exploring innovative, sustainable quaternary treatment solutions (e.g., intensified CWs, MBBRs, microalgae systems) at both laboratory (TRL1-TRL4) and pilot-scale (TRL5-TRL7), including patenting efficient systems; and 2) rigorously evaluating the safety of reclaimed water use in agriculture via metabolomics studies.

Resumen del Currículum Vitae:

The main objective of my research is to enhance the sustainability and efficiency of wastewater treatment processes to promote water reuse. I am specialized in the design and assessment of different wastewater treatment technologies, with a focus on sustainable solutions such as Nature Based Solutions (NBS). I use analytical chemistry (GC or LC coupled to mass spectrometry) to evaluate the efficiency of technologies and to understand the pollutant-degradation mechanisms. I established my expertise during my PhD at Aarhus University, focusing on organic micropollutant removal kinetics in biofilm reactors, which resulted in four highly cited first-author articles. After my PhD, I supervised four studies on micropollutant attenuation mechanisms in Moving Bed Biofilm Reactors (MBBRs) at laboratory scale. Later, I switched from academic to private research, and I worked for MS-Omics Aps (Denmark), where I gained experience in the metabolomics field. In 2019, I returned to Spain and I joined the Institut Català de Recerca de l'Aigua (SCOREwater project). There, I used my knowledge on analytical chemistry and wastewater to perform the first study of the group on sewage epidemiology. Upon securing the Beatriu de Pinós (BP) grant (Marie Curie COFUND) in 2020 at IDAEA-CSIC, I achieved independence, pioneering the use of metabolomics to improve NBS performance by understanding the role of root-exudates in micropollutant removal. I currently lead an independent research unit developing new sustainable wastewater treatment solutions (NBS, MBBR, microalgae, etc.) and applying metabolomics to study the environmental effects of wastewater reuse on crops. This successful line is sustained by continuous national/international funding and five active knowledge-transfer contracts with private industry (e.g., AstraZeneca, Girbau S.A, UPC). My leadership and research quality are confirmed by a coherent publication record (42 peer-reviewed publications, H-index of 21, >1700 citations), strong industrial collaborations, and the successful supervision of two excellent-cum laude PhD candidates and ongoing mentorship of two more, demonstrating a high impact on both scientific advancement and researcher development.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: ERDOZAIN IBARRA, MAITANE
Referencia: RYC2025-056270-I
Correo Electrónico: maitane.erdozain@gmail.com
Título: International research on forest and freshwater ecosystems to restore resilient and multifunctional landscapes

Resumen de la Memoria:

My research career focuses on understanding and restoring forest and freshwater ecosystems under accelerating global change. I work at the interface between forest management, river ecology, fire ecology and environmental policy, integrating biophysical, social and historical perspectives. A defining feature of my trajectory is my capacity to lead large interdisciplinary teams and to generate applied research with direct relevance for biodiversity conservation, climate adaptation and ecosystem restoration.

Through multiple high-impact research articles, I have provided evidence on the factors that facilitate or hinder successful forest restoration at both European and national scales. Within the H2020 SUPERB project, I led the development of 18 historical national narratives on forest restoration written by 32 experts, extracting lessons on what has enabled or constrained success over time. As PI of the Spanish REFORADAPT project, I directed an expert evaluation of the factors influencing restoration success in Spain and the most appropriate indicators to assess it. This work has been very positively received and has positioned me as a reference scientist in Spanish policy debates on the implementation of the EU Nature Restoration Regulation.

I have also contributed significantly to understanding how forest management and fire affect freshwater ecosystems. My PhD and postdoctoral research in Canada produced pioneering studies on the effects of forest practices on stream biodiversity, food webs and ecosystem functioning, including early applications of ethanol-based DNA metabarcoding for biomonitoring. This research has been directly taken up by the forestry industry through my six-year participation in the Forest Research Advisory Committee.

My career is strongly international. I have carried out extended research stays in Canada (7 y) and Sweden (1 y), and shorter but impactful stays in Norway, Brazil and Argentina. Even within Canada, I conducted stays across five institutions, demonstrating mobility and adaptability. I have coordinated experts from 18 European countries within SUPERB, and nearly 80% of my 132 co-authors are international. These experiences have broadened my scientific vision, built long-lasting collaborations and established me as an internationally connected researcher.

In recent years, I have consolidated my independence by leading competitive projects and coordinating multidisciplinary teams. As co-leader of the Global Forest Ecosystems Research Group at CTFC, I supervise researchers, secure funding and develop new research lines. I designed and led REFORADAPT (Biodiversity Foundation) and recently obtained three-year funding from the Catalan Water Agency to lead a project on riparian restoration. I have also initiated new research directions (e.g., fire impacts on aquatic ecosystems), supervised a master's thesis, served on a PhD committee and reviewed for multiple journals.

Looking ahead, I aim to consolidate three main research lines that build on my international and multidisciplinary background: 1) understanding fire effects on aquatic biodiversity and ecosystem functioning to support integrated fire management; 2) restoring and conserving riparian forests under increasing human pressure; and 3) quantifying the cultural services of rivers and riparian forests and their relationships with ecological condition.

Resumen del Currículum Vitae:

I hold a BSc in Biology (UPV/EHU, GPA 9.72) and a PhD in Biology (University of New Brunswick, Canada), with an international, multidisciplinary trajectory in riparian, fluvial and forest ecosystem management and restoration. I completed a Master's in Sustainable Water Management in Sweden (riparian buffers and sediment reduction) and a Master's in Teacher Training. I was selected for the Canadian Network for Aquatic Ecosystem Services and awarded the prestigious 'la Caixa' Fellowship in 2015. My PhD analysed how intensive forest management affects ecological integrity in headwater streams using multi-indicator approaches, with research stays at the Canadian Forest Service, University of Guelph, UBC and the Norwegian Institute for Water Research.

My first postdoc, at the Canadian Rivers Institute, was funded by Collaborative R&D grants promoting academia-industry cooperation. I coordinated a project on cumulative impacts of forest disturbance on aquatic ecosystems and their services, leading fieldwork teams, processing samples, analysing data, writing manuscripts and advising forest managers. For six years, I served on the Forest Research Advisory Committee, providing evidence-based guidance to the forestry sector.

In 2022, I joined the Forest Science and Technology Centre of Catalonia (CTFC) as a postdoctoral researcher in the H2020 SUPERB (Green Deal) project, coordinating 34 experts from 18 countries to analyse 150 years of forest restoration practices across Europe. In 2023, I secured competitive national funding from the Biodiversity Foundation (MITECO) to lead the REFORADAPT project, identifying successful forest restoration and adaptation experiences across Spain. As PI, I coordinated 60+ experts through participatory workshops and developed an interactive repository of 380+ cases. I also contribute to FIREADAPT (integrated fire management and biodiversity) with research stays at IBAMA (Brazil, 2024) and CONICET (Argentina, 2025).

I was recently appointed co-leader of the Global Forest Ecosystems Research Group at CTFC. I will soon lead a 3-year, €400,000 project funded by the Catalan Water Agency on *Arundo donax* eradication and riparian forest restoration in Catalonia, and I am preparing additional proposals as PI, including acting as Spanish PI in the Biodiversa+ 2025-2026 call (RECONNECTIT).

My profile combines extensive fieldwork in remote environments (leading 5-8 person teams), advanced laboratory skills (stable isotopes, DNA metabarcoding), solid statistical expertise in R and strong communication with scientific, policy and technical audiences. I have authored 26 scientific articles (24 in Q1 journals; half as first author) and collaborated with 132 coauthors, ~80% international, demonstrating both independence and leadership of large consortia (up to 44 authors).

My research integrates fluvial and riparian ecology with forest management and restoration, generating evidence on how forestry and fire influence biodiversity and ecosystem services and informing sustainable practices. Through participatory processes, I have produced recommendations for Spain's National Restoration Plan and advised institutions such as MITECO, DIBA and SECF. I have supervised a master's thesis, served on a PhD committee, reviewed for multiple journals, and hold C2 certificates in English and Basque and B2 in French.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GARCIA SOUTO, DANIEL
Referencia: RYC2025-055031-I
Correo Electrónico: danielgarciasouto@gmail.com
Título: Genomas en Cambio: Adaptación y Dinámicas Cromosómicas en Moluscos

Resumen de la Memoria:

My research explores how chromosomal and genomic rearrangements drive species diversification and adaptation, with an emphasis on the evolutionary genomics of marine molluscs. Over the past 8 years, I have built an independent research, transitioning from specialist knowledge in molecular cytogenetics, to leadership roles in large-scale genomic initiatives, first as senior postdoctoral researcher and now building towards a fully autonomous investigator by developing a unique, niche profile: chromosomal evolution in marine invertebrates.

Early in my career, I established myself as a specialist in molecular cytogenetics of marine invertebrates, elucidating their karyotype evolution and satellite DNAs (e.g. Sci. Rep. 2017; Genes 2018). Building on this foundation, my postdoctoral work expanded to the field of genomics and chromosomal rearrangements during my tenure at the Wellcome Sanger Institute (UK), where I led conceptual frameworks for genomic assembly and variant identification as part of the PANCANCER consortia, as well as in the genomic epidemiology of the COVID-19 pandemic as part of two SARS-COV-2 genomic monitoring groups, SeqCovid and EPICOVIGAL. In parallel, I developed my independent research focused on marine bivalve transmissible neoplasias as non-canonical models of genome evolution and disease. As first and corresponding author of an eLife (2022) I led the conceptual framework, variant calling pipeline development, and manuscript preparation for a study revealing cross-species cancer transmission in clams. As shared first author of a Nat. Cancer (2023), I was instrumental in directing genome assembly and annotation workflows for *C. edule*, overseeing sample collection across Europe and mentoring junior researchers in genomics, all executed during my period as postdoctoral researcher.

My research also extends to adaptive genomics under stress, leading transcriptomic and epigenomic studies in bivalves (e.g. J. Therm. Biol. 2023, J. Invertebr. Pathol. 2025) and corals (e.g. Molecular Ecology 2023; J. Therm. Biol. 2025). I conceptualized led the NLA Chrom Evol (Assemble plus, 2019) and EVOKE (Plan Social ENCE, 2024-2025) projects, securing independent project coordinatorship and driving all bioinformatic analyses and publications (Genes 2018; Mar. Biol. 2024; Curr. Zool. 2025). My genomics expertise also enabled me to join the European Reference Genome Atlas (ERGA) initiative, contributing as an author (Genetica 2025; ORE 2025) and serving on the Sampling & Sample Processing and Data Analysis Committees, as well as participating in the 10kLepGenomes COST action.

My scientific output comprises 43 peer-reviewed publications (>1,800 citations, H-index=17), with strategic contribution diversity: 17 as first author (demonstrating conceptual leadership), 4 as corresponding author (evidencing independent research direction), and collaborative work spanning Europe, North America, and Asia. Prior to obtaining my current appointment, I have authored or co-authored publications in Nature, Nat. Genetics, Nat. Cancer, and eLife, establishing me as researcher capable of high-impact contributions. My achievements have been recognized through multiple distinctions: Extraordinary Doctorate Award (UVIGO, 2016-2017) for innovative methodological approaches in marine cytogenetics.

Resumen del Currículum Vitae:

My research explores how chromosomal and genomic rearrangements shape diversification, adaptation, and disease, with a strong focus on marine invertebrates. I have developed an independent profile bridging molecular cytogenetics, genomics, transcriptomics, and epigenomics, integrating methodological innovation with evolutionary biology. During my PhD at UVIGO (2012-2017, Extraordinary Doctorate Award), I advanced understanding of molluscan karyotype evolution and satellite DNA architecture, producing solid publications and setting the foundations for later work. International research stays at the Rudger Boskovic Institute and Florida International University strengthened my expertise in cytogenetic and epigenomic techniques, built long-term collaborations, and generated a productive record of co-authored papers across genetics, evolution, and marine biology.

As a postdoctoral researcher at CIMUS-USC and the Wellcome Sanger Institute (2018-2021), I contributed to major international initiatives, including the PANCANCER project and an ERC-funded programme on bivalve transmissible cancers. I designed analytical pipelines, coordinated global sampling, and led conceptual developments that resulted in pioneering insights into genome instability and cancer evolution, with first-author publications in eLife and Nature Cancer, and contributions to Nature Genetics, Nature Communications, and other high-impact journals. I also developed independent lines on chromosomal evolution in cancer and marine invertebrates, securing competitive funding and producing a growing body of publications. Currently at IIM-CSIC, I participate in research on ancient DNA in Atlantic salmon. My scientific output includes 43 peer-reviewed papers, 17 as first author and 4 as corresponding author, more than 1,800 citations, an H-index of 17, and over 40 conference contributions.

I maintain active collaborations with institutions across Europe, North America, and Asia, and contribute to scientific communities through roles in the European Reference Genome Atlas committees and the 10kLepGenomes COST Action. I have organized workshops on sample standardization and genomic data stewardship, training more than 50 researchers and supporting the European Blue Biobank initiative. I have also delivered specialized bioinformatics training for clinical RNA-based analyses.

My work has direct societal relevance through collaborations with industry, public health agencies, and fisheries, providing genomic and cytogenetic solutions for vaccine evaluation, ploidy assessment, and resource management. During the COVID-19 pandemic, I supervised sequencing and bioinformatics efforts that contributed to national and European genomic surveillance, resulting in high-impact publications in Nature and Nature Genetics.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I actively engage in science outreach through public talks, school activities, media contributions, and accessible online content, reaching broad audiences. I have supervised PhD, MSc, BSc, practicum, and Erasmus trainees, resulting in multiple co-authored papers, and have taught more than 400 hours in genetics, genomics, molecular biology, and bioinformatics across several universities. I serve as Associate Editor in multiple journals, review manuscripts and research proposals, and contribute to scientific governance at national and international levels.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MINAUDO, CAMILLE
Referencia: RYC2025-057367-I
Correo Electrónico: camille.minaudo@gmail.com
Título: Carbon and nutrient biogeochemical processes in aquatic ecosystems of the Anthropocene

Resumen de la Memoria:

My research focuses on understanding how carbon and nutrients are mobilised, transformed, and cycled across aquatic ecosystems in the Anthropocene. Since the early 19th century, environmental change has profoundly altered inland and coastal waters: warming trends, shifting hydrology, eutrophication, and habitat degradation now shape biogeochemical processes from headwaters to the coastal ocean. My trajectory combines field campaigns, long-term datasets, in situ sensors, satellite observations, and modelling to resolve these dynamics across scales. During my doctoral and postdoctoral work, I investigated catchment-scale carbon fluxes, long-term nutrient trajectories, and their ecological implications. I have contributed substantially to understanding how climatic extremes and human pressures regulate primary production, biogeochemical reactivity, and greenhouse gas (GHG) fluxes in rivers, lakes and wetlands. I now integrate optical measurements and remote sensing to link biogeochemical processes with their spectral signatures, enabling high-resolution observation of inland-water dynamics. This interdisciplinary background positions me strongly to address three complementary research lines:

1. Ecological responses to changing nutrient stoichiometry along the land-sea continuum

Human activities have profoundly altered nitrogen and phosphorus delivery to rivers, lakes, wetlands, and coastal zones. These changes generate stoichiometric imbalances that can trigger regime shifts, hinder restoration, and reshape carbon cycling. I will identify the long-term drivers of stoichiometric change, determine when imbalance leads to ecological transitions, and quantify its consequences for GHG fluxes. This work will integrate hydrological, ecological, and limnological datasets across connected ecosystems to inform restoration and management at basin scale.

2. The role of authigenic calcite in carbon and nutrient cycling in inland waters

Calcite precipitation is widespread in inland waters, yet its contribution to carbon cycling remains insufficiently quantified. CaCO_3 production affects CO_2 supersaturation, modulates phosphorus availability, and alters underwater light conditions. I will combine satellite observations, field measurements, and process-based analyses to characterise when and where calcite forms, evaluate its ecological role, and quantify its influence on inorganic carbon pathways in lakes and reservoirs.

3. Optical properties of inland waters as indicators of biogeochemical processes

Inherent optical properties (IOPs) provide a powerful window into dissolved and particulate matter dynamics, but remain underused in limnology. Building on my experience with hyperspectral profilers and radiometric instrumentation, I will use IOPs, AOPs, and bio-optical models to quantify short-term events, ecosystem metabolism, and phytoplankton physiological rates. These measurements will strengthen links between field observations and remote sensing, enhancing our capacity to monitor inland-water quality at high spatial and temporal resolution.

Together, these research lines form a coherent programme aimed at advancing our understanding of biogeochemical processes in a rapidly changing world and at improving the scientific basis for aquatic-ecosystem management and restoration.

Resumen del Currículum Vitae:

I am an interdisciplinary geoscientist specialising in aquatic ecosystem biogeochemistry. My research focuses on (i) the mobilisation and reactive transport of carbon and nutrients at the catchment scale; (ii) the effects of climate change and long-term nutrient stoichiometry on primary producers; and (iii) the optical signatures of biogeochemical processes. I address these questions using high-frequency hyperspectral sensing, portable gas analysers, advanced analytical chemistry, numerical modelling, and remote sensing.

I have worked in France, Switzerland, and Spain and maintain a broad international collaborative network, having co-authored publications with 253 researchers across 44 countries. I have authored 42 scientific publications (40 peer-reviewed, 11 as first author) and 2 book chapters, accumulating 1,534 citations (11/12/2025). I have delivered 47 conference contributions, including 17 as first author and 3 invited talks. I have participated in 15 national and international projects, serving as PI in 3 and contributing to securing funding for 5. I currently lead 2 projects and collaborate in 1 EU Horizon initiative and 4 national projects. My track record has been recognised through two competitive fellowships: a 2-year María Zambrano and a 3-year Beatriu de Pinós fellowship co-funded by AGAUR and the EU MSCA programme.

I assume key scientific leadership roles, including the operation of high-technology instruments, the coordination of large-scale sampling campaigns, and participation in scientific expeditions. My international recognition is also reflected in leadership positions such as my 2025 election to the Steering Committee of the Global Lake Ecological Observatory Network (GLEON) as co-Chair of its Postgraduate Association, where I am contributing to the organisation of the 2026 global meeting. I have organised specialised workshops and co-organised thematic sessions at major EGU and ASLO conferences.

My research directly informs conservation, monitoring, and water management, and I regularly engage with stakeholders through invited presentations, interviews, and technical workshops.

I am strongly committed to open science, both as a core developer of a limnological data platform and as the author of several large-scale open-access databases. I prioritise open-access publishing and systematically share code and data through GitHub/GitLab and dedicated repositories. I also contribute to outreach through guided visits, public events, and science communication.

I have taught 191 hours at undergraduate and postgraduate levels and supervised 8 students (1 Bachelor, 6 MSc, 1 PhD). I actively promote inclusive, collaborative research environments and serve the scientific community as Associate Editor of Marine and Freshwater Research and reviewer for leading journals.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: REQUENA MULLOR, JUAN MIGUEL
Referencia: RYC2025-055788-I
Correo Electrónico: juanmir@ual.es
Título: Quantitative methods to advance Global Change adaptation

Resumen de la Memoria:

Human activities drastically alter the biosphere, causing habitat degradation and biodiversity loss. Understanding socio-ecological systems' responses is crucial for adaptation to global change. Advanced modeling and scientific programming enable ecologists to better understand these processes across spatio-temporal scales. My research focuses on advancing Global Change adaptation through innovative methodologies and multidisciplinary collaboration. I bring extensive expertise in quantitative ecology, remote sensing, and scientific programming to address the challenges of nature degradation and promote sustainable, resilient socio-ecological systems. My work acknowledges the profound and interconnected influence of the human footprint on natural systems, supporting informed and sustainable management efforts. After my predoctoral studies, which focused on incorporating satellite-based ecosystem functioning descriptors into ecological niche modeling, I gained international experience as a postdoctoral researcher at prestigious institutions, including Idaho State University, Boise State University, and the University of Michigan. Key achievements include the development of innovative models to assess the legacy impacts of land use on ecosystem services, free open-source software for land use change analysis, and robust AI-driven dataset repositories. I have also created inference models to evaluate wildfire and drought impacts on ecosystems and applied remote sensing techniques to explore Global Change effects on biodiversity. After my international postdoctoral avenue, I earned a highly competitive contract through the "María Zambrano" program to attract and retain top-tier international talent, where I expanded my focus to the interplay of human, animal, and environmental health, analyzing its communication on social media using artificial intelligence techniques. I am currently the sole PI of the research project "AdapGreenAI" funded by the Spanish "Generación de Conocimiento 2023" call and focused on applying Artificial Intelligence methods to advance sustainability challenges in agricultural settings. In recognition of my achievements, I received the Best Research Award from the Faculty of Experimental Sciences at the University of Almería in 2023. My outreach activities include publishing in public-facing journals, conducting interviews on TV and radio, and administering educational blogs, helping to make complex scientific knowledge accessible to broader audiences. I have actively promoted open-science practices, developing open-source software and datasets. For example, I led the creation of a dataset of vegetation height across Mexico's ecosystems powered by Microsoft. I have been involved in transfer projects that use advanced modeling and remote sensing techniques to develop solutions for land management, biodiversity conservation, and ecosystem health. This includes leading the development of software for land-use change analysis. Regarding scholarly dissemination, my research has been widely published in prestigious peer-reviewed journals and cited in numerous studies, further validating the relevance and impact of my work. Finally, I have accumulated extensive teaching and mentoring experience, fostering interdisciplinary collaboration and critical thinking to address complex socio-ecological challenges.

Resumen del Currículum Vitae:

I bring a strong research trajectory that bridges disciplines and scales. I hold a Master's in Global Change Assessment and Monitoring (2012) and a PhD in Applied and Environmental Sciences (2015) from the University of Almería. With over 9 years of postdoctoral experience, 4.3 years at institutions like Idaho State University, Boise State University, and the University of Michigan, I have gained extensive expertise in interdisciplinary research and built a strong international network. My participation in programs such as EPSCoR (USA) and Microsoft's AI for Earth highlights my commitment to advancing global challenges. Currently, I lead the AdapGreenAI project (€111,250) as Principal Investigator (PI) at the University of Almería, funded through the competitive "Generación de Conocimiento 2023" program. This project integrates Artificial Intelligence to develop sustainable solutions for intensive agriculture. Previously, I was awarded a María Zambrano contract (€147,000) to explore interconnections among human, animal, and environmental health. I have authored 41 publications, including two books, a book chapter, 4 outreach articles, and 34 peer-reviewed papers, with 32 indexed in JCR and 26 in Q1 journals. As the first author of 15 articles and the second author of 4, I have demonstrated leadership in hypothesis testing and research innovation. My work has received 492 citations, with an h-index of 11 (Scopus) and 13 (Google Scholar). Throughout my career, I have secured €278,779 as a PI through competitive programs like Generación de Conocimiento 2023, María Zambrano, and Microsoft's AI for Earth. I have also participated in over 10 collaborative projects funded by the Spanish Ministry of Science, the Andalusian government, the EU, and the USA NSF, including LIFE or GEM3 SEES projects, addressing ecological and socio-ecological challenges. Committed to bridging science and society, I have led outreach activities such as the European Research Night and contributed to public-facing journals like CienciaDirecta and Agricultura. I have developed open-source tools, including software for land-use change analysis (registered in the Andalusian Intellectual Property Registry) and an AI-driven vegetation dataset in the LILA BC repository powered by Microsoft. I also contributed to a TRAGSATEC transfer contract, and I maintain GitHub repositories to promote research accessibility. Regarding teaching, I have coordinated Geoscience modules at Boise State University and currently teach in Agricultural Engineering, Environmental Sciences, and the Master of Sustainable Natural Resources and Ecosystem Services programs at the University of Almería. I am mentoring 1 PhD, 1 MSc student, and 1 undergraduate student, with prior experience advising 3 MSc and 3 undergraduate students. As an Editorial Board member for Global Environmental Change Advances, I support high-impact research dissemination. I have reviewed over 25 JCR journals and served as an evaluator for AEI. In 2023, I received the Best Research Award from the Faculty of Experimental Sciences at the University of Almería. I have presented at over 30 conferences, chaired sessions at events like the I Congreso Iberoamericano de Jóvenes Investigadores del Mar, and participated in organizing major conferences such as the XVI AEET Congress and the 4th International Entomophagous Insects Conference.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: VAN DER LUBBE, JEROEN

Referencia: RYC2025-057051-I

Correo Electrónico: jeroen.vd.lubbe@gmail.com

Título: Assistant professor (UD1)

Resumen de la Memoria:

My research focuses on multi-proxy paleoclimate and palaeoceanographic reconstructions, especially land-sea interactions in the Indian Ocean region. My PhD work on the Zambezi deep-sea fan show how sea-level change, circulation, and rainfall shaped sediment fluxes. Later, I applied Sr isotopes of ostracods and molluscs to reconstruct hydrological variability in East Africa and the Baltic Sea and contributed to the ICDP-HSPDP drilling project.

As a postdoc, I sailed on IODP Expedition 361, recovering the first long sediment archives from offshore Mozambique and South Africa. Hereafter, I obtained a Tenure Track position in Stable Isotope Geochemistry at Vrije Universiteit Amsterdam (VU), for which I was teaching, led the Stable Isotope Laboratory, and developed new analytical methods for fluid-inclusion isotope analysis.

The postdoctoral researcher position at Cardiff University resulted in multiple high-impact publications, including a first-author Nature paper on Mozambique Channel circulation and eastern African hydroclimate over last 7 Myr, and contributions to studies on Mid-Pleistocene Transition and iceberg-ocean interactions. In 2020, I returned to VU and completed my Tenure Track and was promoted to Assistant Professor at UD-1 level, coordinated the MSc programmes and supervised numerous BSc, MSc, and PhD projects.

I have secured diverse external funding, including NWO and NSF projects on vertebrate palaeoecology, paleo-seasonality, and Homo erectus. Current research focuses on high-resolution IODP climate records and isotopic reconstructions from Africa and Southeast Asia to better understand rainfall seasonality and land-sea climate linkages shape human evolution, and will affect rainfall patterns during a warmer climate.

Resumen del Currículum Vitae:

My research is centred on innovative analytical developments in stable isotope geochemistry that enable high-resolution paleoclimate and -environmental reconstructions. Over recent years, I have established several key research lines at VU that advanced laboratory capabilities and supported various publications:

- Miniaturized carbonate isotope analysis: Precise $d^{13}C$ and $d^{18}O$ measurements on very small carbonate samples (single ostracods, foraminifera, and small apatite samples), enabling seasonal reconstructions from biogenic fossils.
- Fluid-inclusion isotope geochemistry: Methods for d^2H and $d^{18}O$ analyses of H_2O bearing inclusions and CO_2 in gas/fluid inclusions in carbonates and minerals, supporting studies of paleotemperature, diagenesis, and fluid migration.
- Sediment provenance tracing: Nd and Sr isotope analyses on targeted sediment fractions based on end-member modelling allowing reconstruction of changes in source areas and transport pathways.
- Phosphate oxygen isotopes in biogenic apatites: Complementary to carbonate isotopes, this diagenetically more resistant proxy improves reconstructions of environmental conditions and vertebrate ecology.

These lines illustrate sustained innovation in stable isotope geochemistry and formed the base of several PhD projects. With the proposed grant, I will extend these methods into new, integrated topical research lines focused on rainfall seasonality and land-sea climate linkages in the Indian Ocean region:

- Fluid-inclusion isotope records from Kenyan speleothems: Newly collected speleothems near Panga Ya Saidi will provide the $d^{18}O$ - d^2H fluid-inclusion record for the last glacial-interglacial cycles, calibrated against modern isotopic time-series of daily rainfall that I established for the coastal zone of Kenya.
- Coupled marine-terrestrial reconstructions: High-resolution d^2H leaf-wax records in combination with benthic $d^{18}O$ -based chronologies, XRF bulk geochemistry, and Sr -Nd provenance data from nearby marine cores will complement the speleothem fluid-inclusion records and extend rainfall reconstructions back to MIS 6.
- Resolving the African rainfall paradox: Integrating Mg/Ca- and alkenone-based Sea Surface Temperatures (SST) with fluid-inclusion and leaf-wax isotopes will directly link western Indian Ocean SST variability to hydroclimatic changes along the coast.
- Seasonality from individual foraminifera: LA-ICP-MS Mg/Ca prior to the $d^{18}O$ analysis of single shells will yield seasonal reconstructions of salinity and in turn rainfall/runoff variability.
- Broadening to East Africa and Southeast Asia: Building on ICDP-HSPDP records and future drilling proposals, I aim to coordinate workshops and collaborations for retrieving long terrestrial cores from East Africa and Java. These archives will clarify the role of Indian Ocean dynamics in shaping long-term climate variability and hominin evolution.

Through this grant, I aim to establish innovative research lines in Spain, integrated with larger international infrastructures such as IODP3 and ICDP. Leveraging my extensive international network, I will build a collaborative research team, secure European (e.g. ERC) and national funding, and transfer the fluid-inclusion technique to a Spanish laboratory.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: DOMÍNGUEZ GARCÍA, VIRGINIA
Referencia: RYC2025-056382-I
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Título: From Patterns to Predictions: Building a Mechanistic Ecology for a Changing World

Resumen de la Memoria:

I am a physicist turned community ecologist, driven by the goal of understanding how ecological communities respond to global change and advancing towards a more predictive ecology to support biodiversity conservation. I combine network theory, dynamical models, and empirical data to study how ecological communities are structured, function, and persist. My work spans four themes: (1) uncovering and validating interaction patterns, (2) understanding how structure shapes community functioning, (3) rethinking how ecological stability is quantified, and (4) bridging theory and empirical data.

Across these lines, my career shows a clear scientific evolution—from revealing patterns, to uncovering mechanisms, to working directly with real ecological systems. Early in my trajectory, I focused on the architecture of ecological interactions, showing that common patterns such as nestedness or species importance can emerge from simple constraints. This helped clarify which structures reflect underlying ecological processes and which may arise by chance.

As my research progressed, I turned to how interaction structure influences ecosystem functioning. I contributed to explaining why some food webs remain stable even as they become more complex, and later demonstrated that communities combining several interaction types behave very differently from those governed by a single interaction type. These studies expanded the classical view of biodiversity maintenance by revealing that robustness depends on the full diversity of ecological relationships.

Building on this work, I incorporated temporal dynamics to understand how communities reorganize through time. Using long-term plant–pollinator data, I showed that year-to-year “rewiring” among species that remain in the community substantially enhances stability—highlighting interaction flexibility as a key mechanism for persistence under environmental change. This established a coherent structure & function; dynamics pathway in my research.

In parallel, I explored how ecological stability is defined and measured, demonstrating that stability is inherently multidimensional and that different metrics capture different ecological responses. This work helped unify fragmented approaches and clarified the methodological foundations of stability research.

Over time, I have increasingly grounded theoretical ideas in high-quality empirical data. My recent work shows that theory can meaningfully predict persistence and stability in nature, opening new possibilities for a truly predictive ecology. This scientific progression—from theoretical patterns to mechanisms, and from mechanisms to real-world dynamics—reflects not only growing expertise but also an expanding ecological intuition.

Today, I lead ambitious, interdisciplinary projects that address key global-change drivers such as landscape intensification, heat extremes, and insect decline. These projects sit at the frontier of ecological knowledge and aim to generate the tools needed to anticipate how biodiversity will reorganize in a rapidly changing world.

Together, my work reflects a coherent evolution: from physicist to independent ecologist, building an integrative, rigorous, and forward-looking research programme centred on understanding how ecological communities persist and adapt under global change.

Resumen del Currículum Vitae:

I am a physicist turned community ecologist. My main goal is to understand how ecological communities respond to the ongoing global change, moving towards a more predictive ecology to improve biodiversity conservation. To this end, I leverage my experience and knowledge of statistical physics and complex systems to solve relevant problems in ecology. I have a broad multidisciplinary training, which I have successfully applied to understand the functioning of ecological communities and their response to external stimuli. My research is interdisciplinary, with a strong emphasis on synthesis, and combines different methodologies, among them complex networks and coupled differential equations, to gain a comprehensive understanding of how ecological communities are structured and function. The research I have developed can be organised in 4 interconnected topics: 1) characterising how ecological interactions are structured and assessing the statistical significance of the interaction patterns, 2) understanding the impact of interaction patterns on community functioning, 3) meta-studying of ecological stability to determine how assumptions shape our conclusions, and 4) bridging theoretical and empirical ecology by testing state-of-the-art theory with field data. The 10 highlighted papers represent significant contributions to these topics.

My scientific career is defined by high-quality, high-impact research. I have consistently published in leading journals in ecology and interdisciplinary science (Nature Ecology & Evolution, Ecology Letters, PNAS, Scientific Reports), with more than 1000 citations and first-author papers that receive twice the field-average citation rate. This reflects both the novelty of my contributions and my commitment to rigorous, reproducible science: all my datasets and code are openly accessible, and I routinely publish preprints and enable public peer-review.

A central strength of my trajectory is independence. From my PhD onward, I have repeatedly defined my own research questions, reframed projects when needed, and built the theoretical and empirical tools required to answer them—whether designing new metrics, developing simulation frameworks, or assembling original databases. I have obtained ~€650,000 in competitive funding, including a Marie Skłodowska-Curie



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

fellowship, and I have published several papers without former supervisors, demonstrating my ability to lead research autonomously while opening new directions.

I have also shown strong leadership in collaborative and organisational roles. I have spearheaded 5 research projects or major tasks, supervised multiple MSc and BSc theses, and co-organised scientific events that bring together theoreticians and empiricists. I have led working groups on gender inequality in ecology, contributed to community training in programming and modelling, and participated actively in outreach. My network now includes more than 80 collaborators across Europe and beyond, and I have been invited to present my work at international institutions and conferences.

Together, these achievements reflect a researcher able to combine creativity, rigour, and strategic vision. I have built a coherent and innovative research programme that integrates theory and data to tackle a central challenge of our time: forecasting how ecological communities persist and reorganize under global change



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: SALMERÓN GARCÍA, IRENE
Referencia: RYC2025-056841-I
Correo Electrónico: irene.salmerongarcia@gmail.com
Título: Closing the Water Loop: Sustainable Management and Reuse of Urban Streams

Resumen de la Memoria:

Europe's Water Resilience Strategy recognizes the direct impact of water pollution on human and ecosystem health and stresses the need to increase water-use efficiency through reuse supported by reliable scientific tools. In this context, urban water systems must shift from fragmented infrastructures to adaptive and circular networks capable of responding to climatic extremes, emerging contaminants, and increasing urban demands.

Dr. Salmerón's long-term research line contributes to this transition by developing next-generation environmental technologies for the treatment, management, and reuse of urban water flows, with particular attention to stormwater and greywater. These streams may contain persistent micropollutants, microplastics, pathogens, and even tire-wear particles, and contaminants from combined sewer overflows, requiring not only effective treatment but also risk assessment frameworks that support planners, operators, and regulators.

Building on her expertise in electrochemical treatments and AOPs (PhD), and her postdoctoral experience with GAC adsorption, Nature-based Solutions, and hybrid treatment trains at large pilot scale, her research aims to develop adaptable systems that can be integrated into drainage networks, stormwater retention tanks, or decentralized reuse schemes. The goal is not the optimization of isolated processes but the design of multifunctional treatment solutions capable of managing fluctuating flows and pollutant loads characteristic of urban environments.

A central innovation axis is the incorporation of digitalization and intelligent monitoring to enable real-time operation, predictive maintenance, and accurate assessment of treatment performance. These tools will support stakeholders in evaluating reuse feasibility, managing risks, and prioritizing interventions in alignment with EU resilience objectives.

This holistic approach positions urban water as a strategic circular resource and supports safe reuse while reinforcing the health and environmental protection goals of current EU regulations. It lays the foundation for climate-resilient and resource-efficient urban water infrastructures consistent with the European Green Deal, the Water Resilience Strategy, and emerging standards for water reuse.

The leadership roles Dr. Salmerón has already assumed, from the design and operation of pilot-scale systems to acting as PI of a water reuse project, demonstrate the technical maturity and strategic vision required to lead an independent research line that advances Europe's transition toward a resilient urban water cycle.

In parallel, she aims to consolidate her career through the following objectives:

- ☑ Strengthen scientific leadership in the water sector
- ☑ Build collaborations with municipalities, utilities, and industry
- ☑ Stimulate technological innovation and contribute to industrial transformation
- ☑ Apply to national and international funding programmes
- ☑ Promote knowledge transfer and train future researchers

Resumen del Currículum Vitae:

Dr. Salmerón's work focuses on developing and bringing to practice advanced technologies for water purification, aiming for increasing their applicability as quaternary treatment in wastewater treatment plants to meet the newest EU standards. She develops her work with a circular approach, where wastewater can be a source of raw materials and an also reused after its purification. During her PhD at PSA-CIEMAT, she made a pioneer work on pilot-scale solar photoelectro-Fenton systems. She modelled hydrogen peroxide production, analyzed electrode ageing and explored the influence of operational parameters, helping define the conditions for a feasible electrochemical treatment of water in real scenarios. In her postdoctoral stage at the University of Luxembourg (60 months), she broadened this expertise to GAC filtration, constructed wetlands, and hybrid systems. By exploring process synergies to increase the cost-effectiveness facilitating their implementation.

As result of her investigation, she is author and co-author of 31 peer-reviewed scientific publications, most of them in high-impact and recognized journals. She has an h-index of 13 and 544 citations. In addition, she has contributed with more than 40 communications to conferences.

Her research has generated new insights into mechanisms for oxidants generation, treatment train design, energy and cost evaluation, and the implementation of pilot systems under real conditions. She has coordinated experimental campaigns, designed integrated treatment solutions, and worked closely with water syndicates to evaluate feasibility and compliance with EU and national regulations. She secured competitive funding as PI of the LetzREUSE Industrial Fellowship, and has taken strategic roles in major initiatives such as SFERA-III-SO-W(H)AT and the EU Water4All RESET proposal. Her international trajectory includes collaborations with institutions and stakeholders across Europe and active participation in shared research infrastructures.

Beyond academia, she has contributed to technology transfer and stakeholder support, developing technical reports for the guidance of the water agencies, and created the open-access STREAM decision support tool for reuse planning. She has also led outreach and communication actions, including a containerized information centre on micropollutants. She did presentations on industrial fair demonstrations, science videos, and participated in European Researchers' Night and school programmes, promoting a responsible use of the water sources while increasing the awareness about emerging pollutants.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

She has taken an active role in training and mentoring early-career researchers, co-supervising a completed PhD thesis, four Bachelor and two Master students, She designed and delivered a module on water reuse for Master students and supervised visiting researchers from multiple institutions. As a reviewer for high-impact journals and member of the Early Career Editorial Board of the Journal of Environmental Chemical Engineering, she also contributes to scientific evaluation and research-community service.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: BRAVO PÁRRAGA, CAROLINA
Referencia: RYC2025-056130-I
Correo Electrónico: carolina.bravo.parraga@gmail.com
Título: Behavioural and Conservation Responses of Threatened Species to Human-Altered Landscapes
Resumen de la Memoria:

My research career centres on understanding how wildlife adjusts its behaviour, trophic ecology and spatial strategies in response to rapid environmental change, with threatened steppe species as a focal system. I have developed an integrative programme that combines behavioural ecology, conservation science, landscape ecology and advanced biologging technologies to uncover the mechanisms driving species' vulnerability and resilience in human-dominated ecosystems.

An early and influential contribution was the discovery of self-medication behaviour in wild birds, showing that great bustard males selectively ingest toxic prey to reduce parasite load and enhance sexual signalling. This work opened a new conceptual line in avian behavioural ecology and led to an externally funded project that expanded the empirical basis of chemically mediated mate choice. In parallel, I developed a long-term line of research on feeding ecology and sexual size dimorphism, demonstrating how sex-specific energetic needs generate trophic divergence and shape morphological evolution. These insights were later extended to anthropogenic landscapes, where I provided the first evidence that farmland transformation and agri-environmental schemes modify foraging strategies in steppe birds.

During my postdoctoral stay at CEBIC-CNRS (France), I established a major research line on the landscape ecology of nest predation, integrating >1,500 experimental nests and predator-identification techniques. This work revealed how predator social structure, vegetation thresholds and landscape heterogeneity interact to determine predation risk, offering mechanistic guidelines adopted by steppe-bird conservation programmes.

My most recent contribution is the development of accelerometry-based behavioural classifiers using machine learning, enabling the fine-scale quantification of behavioural states and energetic expenditure. This methodological innovation initiated at IREC and consolidated through international stays at CNRS (France) and CIBIO (Portugal) now supports a growing supervisory environment, including a PhD thesis and MSc/BSc projects. It forms the foundation of the research project I aim to expand, linking behaviour, energetics and habitat management in multi-species frameworks.

Across institutions in Spain, France and Portugal, I have built a strong international presence, co-organised the International Conference on Palearctic Steppe Birds, and co-founded the Grupo de Investigación en Aves Esteparias (150+ members). My leadership is further reflected in collaborative syntheses, including a major continental-scale review of conservation priorities for European steppes.

Overall, my trajectory shows the progressive consolidation of an original and impactful research programme that integrates mechanistic behavioural ecology with applied conservation to address urgent biodiversity challenges.

Resumen del Currículum Vitae:

I am a wildlife biologist specialised in behavioural ecology, conservation biology and biologging technologies, with a research trajectory spanning five institutions in three countries. I hold a PhD from the MNCN-CSIC, followed by postdoctoral positions at the University of Barcelona, CEBIC-CNRS (France), IREC-CSIC-UCLM and the Universidad Autónoma de Madrid, complemented by funded research stays at CNRS (France) and CIBIO (Portugal). My scientific production includes 26 SCI publications (16 Q1), 15 as first or last author, >730 citations, h-index = 16. I have presented my work in 25 international and national conferences, including invited contributions, and served on the scientific and organising committees of the International Conference on Palearctic Steppe Birds.

I lead original research lines supported by competitive funding: I am Principal Investigator of two projects totalling €130,000, and have participated as researcher in seven competitive projects and nine long-term environmental monitoring programmes, cumulatively exceeding €1 million. I have experience collaborating with public administrations and consultancies on species monitoring, impact assessment and habitat management.

A central component of my CV is my contribution to knowledge synthesis and international collaboration. I am last author of a major continental-scale review on European steppe conservation (Biological Conservation 2025) coordinating >50 experts, and co-author of additional syntheses in Conservation Letters and Sustainability Science. My internationalisation is further supported by active collaborations with CNRS, CIBIO, and European steppe-bird networks.

I have a solid record in student training, having supervised 13 BSc, 6 MSc and 1 PhD student (ongoing), and served on evaluation committees for PhD and MSc theses. My growing methodological research in accelerometry and machine learning provides a strong platform for mentoring early-career researchers.

I maintain robust engagement in science communication, leading or participating in >20 outreach activities reaching >1,000 people, including 11F events, Science Week, and the European Researchers' Night. My work has received national and international media coverage (National Geographic, Science, El Mundo, Agencia EFE, Atresmedia).

I also contribute to scientific service as Associate Editor in Frontiers in Ecology & Evolution, and reviewer for >20 manuscripts across 15 international journals.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: EZQUERRO MARTÍN, PABLO
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Correo Electrónico: ezquerro.martin.p@gmail.com
Título: Peligros geológicos y observación de la tierra

Resumen de la Memoria:

Mi investigación se centra en el análisis, monitorización y modelización de los movimientos del terreno asociados a los diferentes peligros geológicos: subsidencia del terreno, movimientos de ladera, volcanes, inundaciones y terremotos. Empleo las técnicas de Interferometría Radar Satélite (InSAR) para la detección y seguimiento de las zonas afectadas por estos. También las integro junto con otros datos geodésicos y geológicos en modelos geomecánicos y análisis de susceptibilidad para caracterizar los fenómenos responsables y mejorar la gestión del fenómeno. Mi trabajo principal se ha centrado en la subsidencia por extracción de agua subterránea, abarcando desde la detección temprana, la monitorización, la modelización de escenarios pasados presentes y futuros, hasta el análisis de la vulnerabilidad a la misma a nivel local y global. Actualmente mi interés se centra en extender esta experiencia a otros peligros geológicos y naturales en escenarios de multipeligro.

Los peligros geológicos abarcan una amplia variedad de procesos geológicos que en ocasiones pueden interactuar entre ellos. Basado en las aportaciones de diferentes autores y organismos se pueden identificar 8 tipos de peligros principales: terremotos, vulcanismo, maremotos, deslizamientos, avalanchas, inundaciones, karstificación y subsidencia. Debido a su impacto sobre la sociedad y las actividades económicas se ha desarrollado un conjunto normativo para la prevención y mitigación de los efectos derivados respecto a los de mayor impacto potencial. En los demás no existen normativas específicas y se remite a planes regionales que se puedan desarrollar a tal efecto.

La línea de investigación a desarrollar se centrará en estudiar la dinámica de los diferentes peligros geológicos con el objetivo de entender su impacto en las actividades humanas, ayudando a prevenirlos y mejorando la resiliencia de las comunidades. Esto se abordará tanto para la etapa de prevención como para la de emergencia. Para este fin se investigará la aplicabilidad los actuales datos de interferometría radar (InSAR) para obtener resultado avanzados en términos de vulnerabilidad e impacto potencial. Además, se explorarán los límites de la técnica, estudiando nuevos desarrollos y metodologías basados en este tipo de datos para mejorar la caracterización de los peligros geológicos, especialmente durante la fase de emergencia.

La entrada en funcionamiento de plataformas de procesamiento semi-automático y servicios como el European Ground Motion Service (EGMS), proveen actualmente a los Servicios Geológicos y entidades privadas de resultados masivos difíciles de gestionar y analizar. La línea de investigación se ha dividido en tres bloques de trabajo: 1: Estudio de los desplazamientos en relación con el impacto de los peligros geológicos en la fase de prevención. Para ello se utilizarán prioritariamente datos en abierto SAR de la constelación Sentinel-1 e InSAR del EGMS para el cálculo y generalización de la probabilidad de daños en estructuras. 2: Aplicabilidad de los datos SAR a los peligros geológicos durante la fase de emergencia. Partiendo de los datos SAR más relevantes: desplazamientos InSAR y DInSAR, Coherencia y Amplitud, se estudiará su utilidad para aportar información relevante para el flujo de la emergencia. 3: Disseminación, educación y transferencia de resultados, incluyendo el plan de gestión de datos.

Resumen del Currículum Vitae:

En los últimos 10 años he participado en un total de 62 contribuciones científicas. Los 31 artículos científicos publicados en revistas del Science Citation Index (periodo 2014-2025) tienen un total de 1378 citas. De estas contribuciones 16 han sido publicados en revistas de muy alta relevancia (primer decil), 7 más en revistas de alta relevancia (primer cuartil) y 8 en revistas de relevancia media (segundo cuartil). De estos destaca un artículo publicado en la revista de gran impacto Science (JIF 47.728, 384 citas desde 2021) con un ²Altmetric Attention Score² de 843 que lo sitúa en el 1% más mencionado de las publicaciones del mismo periodo y en el 5% de todas las comparadas.

Mi investigación, así como los proyectos en los que he participado, se han caracterizado por poner gran importancia en trasladar a la sociedad los avances de los mismos. Esto se pone de manifiesto a en la estrecha colaboración con entidades como la Confederación Hidrográfica del Segura (CHS) con la que a través del proyecto AQUARISK se trabajó en la mejora del conocimiento del acuífero del Alto Guadalestín y su gestión. El artículo sobre la subsidencia mundial publicado en Science ha servido como referencia para 7 documentos políticos de entidades como Naciones Unidas o la Unión Europea. Durante la erupción volcánica del volcán de Tajogaite (La Pama), forme parte del equipo de apoyo a la emergencia, recibiendo por la comunicación del equipo a la sociedad, el premio CSIC-Fundación BBVA de Comunicación Científica. Los resultados sobre detección y clasificación de movimientos del terreno del proyecto RASTOOL han sido reconocidos por el mecanismo europeo de protección civil europea proponiéndose el estudio de la metodología para su integración como producto dentro del mecanismo de respuesta ante emergencias del programa Copernicus. Durante mi carrera investigadora he sido co-tutor de 2 Trabajos de Fin de Master y tutorizado a 3 alumnos en prácticas curriculares en la UPM y UA de Madrid. Además realicé una estancia en el periodo de pre-doctoral de 3 meses en la Università degli Studi di Firenze en el Dipartimento di studi della Terra. Además, soy miembro observador de la Land Subsidence International Initiative (LASII) de la UNESCO, que agrupa a los expertos más relevantes del campo de 18 países.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MAIRAL PISA, MARIO
Referencia: RYC2025-056504-I
Correo Electrónico: mariomairal@gmail.com
Título: Integrative Phylogeography: Linking Macro- and Microevolutionary Processes in Plant Lineages from Island Systems

Resumen de la Memoria:

I am a plant evolutionary biologist whose research integrates biogeography, phylogeography, population genomics and island biodiversity. My scientific trajectory shows a coherent and continuous progression from my PhD focused on the Rand Flora, the Canary Islands and the role of geography and palaeoclimate in shaping lineage divergence to an independent programme centred on diversification and persistence in island and environmentally fragmented ecosystems. My doctoral work established the conceptual foundations of my long-term interest in geographic barriers, historical refugia and how heterogeneous landscapes shape evolutionary processes.

During my international postdoctoral appointments at Charles University (Czech Republic) and Stellenbosch University (South Africa), I incorporated new analytical and conceptual approaches, including demographic modelling, polyploid evolution, reproductive biology and invasion genetics. These experiences consolidated my methodological independence and resulted in several first- and corresponding-author papers in Q1 journals such as *Molecular Ecology* and *Journal of Biogeography*, strengthening a unified research line that connects microevolutionary dynamics with large-scale biogeographic patterns. Extensive fieldwork and research stays across Europe, Africa, Macaronesia, New Zealand, Australia and the sub-Antarctic have provided a broad comparative framework for investigating how species diversify, adapt and persist in isolated and extreme environments.

My contributions have advanced understanding of vicariance, paleo-island dynamics, genetic structure and diversification processes, including several highly cited studies (>500 citations) that have shaped current views of Rand Flora evolution and island diversification. Building on this trajectory, my current research expands into a global Southern Hemisphere context through two complementary projects that I lead as Principal Investigator: SUB-GONDWANA (AEI Plan Nacional) and PANDORA (Comunidad de Madrid-UCM). These projects integrate collaborators from all countries with sub-Antarctic territories and establish the first comparative evolutionary framework across Southern Ocean archipelagos.

Overall, my research line is conceptually unified, methodologically robust and internationally oriented. It is supported by competitive funding, a strong publication record, proven leadership, an increasingly active mentoring profile and a worldwide collaborative network. Together, these elements provide a solid foundation for the long-term research programme proposed for the Ramón y Cajal fellowship and for my consolidation as an independent R3 researcher.

Resumen del Currículum Vitae:

I am a plant evolutionary biologist with accredited research and teaching experience (Spanish accreditation as Associate Professor; two research sexennia; one teaching quinquennium). My scientific production includes 30 peer-reviewed articles (22 Q1; 11 as first or corresponding author; 3 as senior author), two book chapters, and several technical and outreach publications. My research integrates biogeography, phylogeography, population genetics and island biodiversity, with applications to plant evolution and conservation in sub-Antarctic, Mediterranean and Macaronesian systems.

I have led eight competitive projects as Principal Investigator: four research projects and four teaching/outreach projects amounting to ~€365k, including the AEI-funded SUB-GONDWANA and the Madrid-UCM PANDORA project. In addition, I have contributed to over 30 national and international research projects, collaborating with institutions in South Africa, Chile, Australia, New Zealand, the United Kingdom, the United States and the Czech Republic. I have delivered more than 70 conference contributions, including six invited plenary or keynote talks, and my work has received multiple distinctions, such as the National Conservation Award of César Gómez Campo.

My teaching record comprises 1,149.5 hours across 11 courses in six universities and four countries (Spain, Czech Republic, South Africa and Finland), with consistently excellent evaluations (DOCENTIA 9.1/9.9/10). I have supervised 24 undergraduate and graduate research projects, including Bachelor's and Master's theses and research-initiation projects. I also participate actively in teaching innovation and have produced educational materials, learning modules and outreach resources.

My international experience includes two postdoctoral appointments abroad (10 months in Prague; 2.5 years in South Africa) and 25 months of additional long-term research stays (pre and postdoctoral) across five countries, together with extensive scientific fieldwork in Europe, Africa, Macaronesia, the Andes, Australia, New Zealand and the sub-Antarctic. These activities reflect a sustained commitment to international collaboration and to a comparative multi-regional research perspective.

I contribute regularly to scientific service and leadership: I am Secretary of SEBICoP (Spanish Society for Plant Conservation Biology) and serve as associate Editor of *Frontiers in Ecology and Evolution* and Chief Editor of *Conservación Vegetal*. I have reviewed 96 articles for more than 28 JCR-indexed journals, participated in evaluation activities for scientific agencies, and contributed to the organisation of scientific symposia, workshops and conferences.

I am also co-founder and national coordinator of the Biomaratón de Flora Española, the largest citizen-science event on plant biodiversity in Spain, which has mobilised more than 10,000 participants and received a competitive FECYT grant. This initiative highlights my engagement with knowledge transfer, societal participation and conservation awareness.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: SOTO GÓMEZ, DIEGO
Referencia: RYC2025-056134-I
Correo Electrónico: diego.cerrada@gmail.com
Título: Researcher in soil physics, biodiversity dynamics and sustainable management of terrestrial ecosystems

Resumen de la Memoria:

Mi trayectoria investigadora se ha desarrollado durante más de una década en el campo de la ciencia del suelo, con especial énfasis en los procesos físicos que controlan la estructura, el transporte de sustancias y la interacción entre el microbioma y la arquitectura del suelo. Desde mis inicios he trabajado en modelización del transporte de contaminantes, análisis de suelos estructurados y caracterización de materiales para su uso como trazadores. Posteriormente, integré herramientas de tomografía computarizada, análisis de imágenes y teoría de la percolación, desarrollando metodologías novedosas para describir la conectividad porosa y los procesos preferenciales de flujo. Este trabajo me permitió abrir varias líneas independientes, como la caracterización multifractal de redes porosas en 3D y el estudio de saltos de presión durante el drenaje, fenómenos con implicaciones tanto hidrológicas como ambientales. En una etapa más reciente he ampliado mi investigación hacia la sostenibilidad, la remediación de suelos y la evaluación de la disponibilidad de metales pesados, incorporando enfoques microbiológicos y ecológicos. Me interesa comprender cómo la estructura física del suelo condiciona la actividad microbiana, y cómo esta interacción puede aprovecharse para mejorar la salud del suelo, la eficiencia de la fitorremediación y la resiliencia frente al cambio climático. He comenzado a explorar el potencial de cultivos perennes (como Kernza) y sistemas agrivoltaicos para la restauración y diversificación de agroecosistemas degradados. Paralelamente, he desarrollado una línea de trabajo centrada en la transferencia de conocimiento, la ciencia ciudadana y la co-creación mediante Living Labs, liderando o participando activamente en proyectos europeos con una fuerte dimensión socioecológica. Mi experiencia incluye el diseño de plataformas digitales, metodologías participativas y modelos económicos basados en los servicios ecosistémicos del suelo.

Las líneas que quiero impulsar durante los próximos años se centran en: (1) mejorar la segmentación e interpretación de imágenes tomográficas mediante inteligencia artificial; (2) profundizar en la relación entre microhabitats físicos y comunidades microbianas; (3) estudiar los saltos de presión y su efecto en la movilización de nutrientes; (4) evaluar el papel de cultivos perennes y agrovoltaicos en la regeneración del suelo; y (5) consolidar enfoques multi-actor orientados a la toma de decisiones y la transición hacia prácticas agrícolas sostenibles.

Resumen del Currículum Vitae:

He desarrollado mi carrera en instituciones españolas e internacionales, combinando investigación, docencia, transferencia y liderazgo de proyectos. Soy Ingeniero Técnico Agrícola, Máster en Ecosistemas Terrestres y Máster en Ciencia y Tecnología Agroalimentaria, y obtuve el doctorado con mención Cum Laude y el Premio a la Mejor Tesis 2020 de la Sociedad Española de la Ciencia del Suelo. Mi especialización abarca física de suelos, tomografía computarizada, análisis de imágenes, microbiología del suelo, modelización y sostenibilidad agroambiental. Soy autor de 28 artículos científicos (gran parte como primer y/o autor de correspondencia), varios libros y capítulos, y he participado en más de 45 congresos. Poseo un índice h de 14 y más de 760 citas. He contribuido también al desarrollo de software en Python para análisis de imágenes, clasificación de señales y cálculo de espectros multifractales. En el ámbito de proyectos, he participado en más de diez iniciativas europeas, entre ellas Diverfarming, SoildiverAgro, MRV4SOC, DeepHorizon, TRIBIOME, BIOServicES, pHYBi y BIOREM. He coordinado y co-coordinado propuestas de Horizon Europe y dirijo actualmente el proyecto IXCHEL (EU-LAC), además de actuar como co-IP y líder de paquetes de trabajo en otras iniciativas. He organizado talleres de co-creación con múltiples tipos de actores y he participado en actividades de divulgación, formación y ciencia abierta, promoviendo el uso de repositorios FAIR y la difusión multiformato de resultados. He realizado estancias en Aarhus University (Dinamarca) y Lund University (Suecia), he supervisado una tesis doctoral ya defendida y actualmente codirijo otra en colaboración internacional. También he dirigido varios trabajos de fin de grado y máster. Mi carrera combina experiencia científica avanzada, liderazgo de consorcios, transferencia de conocimiento y un enfoque interdisciplinar orientado a la gestión sostenible del suelo y la colaboración con sectores productivos y sociales.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: INSUA COSTA, DAMIÁN
Referencia: RYC2025-057401-I
Correo Electrónico: damian.insuacosta@ugent.be
Título: Extreme weather events in a warming world

Resumen de la Memoria:

My research career has progressed from early collaborative roles to the consolidation of an independent and internationally oriented profile in hydro-climatological extremes, land-atmosphere interactions and the dynamical attribution of extreme weather events. I began at the University of Santiago de Compostela, contributing to a European FP7 project and industrial R&D contracts, experiences that strengthened my modelling expertise and shaped the focus of my PhD on Mediterranean precipitation extremes, completed with several first-author publications.

Since 2023, my trajectory has advanced within Ghent University's Hydro-Climate Extremes Lab (H-CEL), where I assumed leadership responsibilities as Work Package Leader in both an ESA project and an ERC Consolidator Grant, coordinating international teams and modelling activities. This period marked a key step in my scientific maturity, leading to the award of my own research project as PI (GEO-Europe) and the Senior Postdoctoral Fellowship of the Research Foundation Flanders (FWO), the most prestigious personal grant in Belgium in the field of science, recognising the consolidation of my independent research agenda.

In parallel, I have developed a self-directed research line on the dynamical attribution of extreme weather events using regional and global climate models. This line, which has already produced two D1 first-author papers, will become the core of my future activity in Spain, aimed at establishing a robust, innovative and internationally connected capacity for physically based attribution of climate extremes, with direct relevance for climate-risk assessment and adaptation.

Resumen del Currículum Vitae:

I am a Senior Postdoctoral Fellow at Ghent University (Belgium), where my research focuses on hydro-climatic extremes, moisture transport, land-atmosphere coupling and the dynamical attribution of extreme events to climate change. I have developed complementary research lines combining numerical modelling and physical diagnostics, resulting in 21 JCR publications (8 first author, 6 second author), including one in Nature Communications, with 816 citations and an h-index of 12 (Google Scholar).

My trajectory reflects increasing leadership and consolidation. I have served as Work Package Leader in both the ESA 4DMED-Hydrology project and the ERC Consolidator Grant HEAT, coordinating international modelling efforts and multidisciplinary teams. I have secured foreign competitive funding as Principal Investigator, including the BOF project GEO-Europe (309,000 €) and the FWO Senior Postdoctoral Fellowship (235,660 €), awarded in a highly competitive call (success rate 15.9%). Together, these achievements demonstrate my capacity to develop, attract and lead ambitious research programmes at the international level.

Moreover, I have supervised two Master's theses and one completed PhD, and currently co-supervise another doctoral student. I have also accumulated 224 hours of teaching, contributed methodological tools such as WRF-WVTs, and maintain strong outreach activity with more than one hundred media contributions. Overall, my CV reflects a trajectory of scientific depth, international consolidation, competitive leadership and the sustained development of an independent research profile.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: BUENO PARDO, JUAN
Referencia: RYC2025-054632-I
Correo Electrónico: jbuonopardo@gmail.com
Título: Designing climate-resilient coastal futures: Nature-Based Solutions for Small-Scale Fisheries
Resumen de la Memoria:

I conduct cross-disciplinary research on marine socio-ecological systems (SES), examining how ecosystem functioning interacts with human activities and livelihoods under growing environmental pressure. My aim is to develop decision-support tools that guide policy making toward a more sustainable future. Following my PhD at the Spanish Institute of Oceanography (University of Oviedo, Cum Laude, International Mention), I established an international research trajectory centered on ecological modelling, time-series and data analysis, and vulnerability assessments to support sustainability decisions. I currently supervise two PhD students and have mentored five MSc and two undergraduate students from various countries and international programs. I have also served on a PhD jury at the University of Oviedo.

At the CIM-University of Vigo, I have designed co-created methodological frameworks applied across diverse case studies to improve sustainability and conservation effectiveness. This includes developing approaches to evaluate the effectiveness of nature-based solutions (NBS) in reducing marine risk and establishing baselines for monitoring and projecting their outcomes. My work has also advanced operational risk assessments for food security in different socio-ecological contexts, helping communicate complex climate-related risks to policymakers and end-users.

My research integrates end-user engagement with fundamental ecological analysis, advanced modelling, and interdisciplinary approaches. I have built an independent research line on marine socio-ecological risk within the Future Oceans Lab. Although contractual conditions have not allowed me to act as PI, I have led major European research efforts as work-package/task leader and steering-committee member in projects such as FutureMARES, ACTNOW, and CERES, coordinating more than 15 international teams and strengthening my leadership in multidisciplinary settings. I am fluent in six languages and maintain strong outreach through articles, social media, education and citizen-science initiatives, and a naturalist blog active since 2007.

The research line proposed focuses on how coastal SES particularly small-scale fisheries (SSF) respond to environmental change, and on how NBS can be designed and evaluated to enhance resilience, sustainability and equity. I integrate ecological vulnerability, socio-economic feasibility, institutional capacity and gender-differentiated impacts into a framework aimed at identifying and implementing effective NBS. This involves close collaboration with SSF stakeholders through field surveys, interviews and participatory workshops, as well as scenario-based risk and feasibility assessments to support transformative and equitable climate adaptation pathways

Research stats:

28 peer-reviewed articles, of which: 27 (96%) in SCImago Q1 journals; 1st or lead author of 10 (36%); 10 articles > 20 citations, 1st author of 6. Total citations = 567; H-index = 15 (Scholar). Author of 3 technical reports, 2 policy briefs, and 10 EU project Deliverables. International papers = 92.8%. International research stays: IPMA (Portugal, 1 month), DTU-Aqua (Copenhagen, 3 months), SAIAB (South Africa, 3 months), and CCMAR (Portugal, 2 months).

Resumen del Currículum Vitae:

I am a postdoctoral researcher at the Centro de Investigación Mariña - Future Oceans Lab (Universidade de Vigo), where I serve as Task Leader and Steering Committee member in the EU H2020 ACTNOW project. My work focuses on marine socio-ecological systems, integrating ecological modelling, time-series and data analysis, and climate-risk assessments to develop decision-support tools that guide sustainability and adaptation in marine policy.

I hold a PhD in Applied Biology (Cum Laude, International Mention) from the University of Oviedo. My international career includes postdoctoral positions at IFREMER (France), CCMAR (Portugal), CESAM (Portugal), and SAIAB (South Africa). Since joining the CIM-University of Vigo in 2020, I have consolidated an independent research line on marine socio-ecological risk, despite contractual limitations that prevented me from acting as PI.

Over the last years, I have demonstrated strong leadership and coordination capacity, managing major European consortia (FutureMARES, ACTNOW, CERES) as work package or task leader, coordinating more than 15 international research teams, and contributing to networks such as e:SBN, ICES WKCLIMAD, and CLIMFISH. I also serve on the Editorial Board of Frontiers in Marine Science and regularly review for high-impact journals.

My scientific contributions include 28 peer-reviewed articles (96% Q1). I have developed a universal methodology to evaluate the effectiveness of nature-based solutions, led key studies on climate-risk and food-security assessments, and advanced modelling of ecosystem and fisheries dynamics. My work has informed policymakers through policy briefs, online tools, and communication products. I have accumulated 567 citations and an H-index of 15.

Bridging science and society is central to my work. I collaborate closely with small-scale fishers, conducting field surveys, co-creation workshops, and participatory processes. I incorporate gender and equity considerations in all research stages and maintain an active outreach profile through science communication, social media, and a naturalist blog I have run since 2007.

I currently supervise two PhD students and have mentored five MSc students from international programs (including IMBRSEA), along with supervising professional internships and Bachelor theses. These experiences strengthen my commitment to capacity building in diverse research environments.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have participated in 10 competitive research projects, ranging from EU Horizon and H2020 to national excellence grants. I have also led the development of open-access tools, facilitated workshops for MPA managers and fishers, contributed to forum book chapters, and collaborated on educational and transfer products such as an instructional board game on climate vulnerability.

My international research stays in Portugal, Denmark, South Africa, and France have broadened my scientific perspective. Overall, my trajectory reflects a strong combination of scientific leadership, interdisciplinary integration, policy relevance, and commitment to advancing climate adaptation and marine sustainability.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: PALLARÉS PÁRRAGA, SUSANA
Referencia: RYC2025-056878-I
Correo Electrónico: susana.pallares@um.es
Título: Integrating ecology, physiology and evolution to unravell adaptation to extreme environments and support biodiversity conservation under global change

Resumen de la Memoria:

I did my PhD at the University of Murcia (2017, Cum Laude, International Mention, Extraordinary Doctorate Award, Limnology Research Award, European Federation for Freshwater Sciences Award), with PhD stays at California Polytechnic State University (USA), University of Plymouth (UK) and the Institute of Evolutionary Biology (Spain). I have developed my postdoctoral career in the Universities of Castilla-La Mancha, Seville, Plymouth (UK), Museo Nacional de Ciencias Naturales, Italy (short stay), and currently at the University of Murcia (funded by an international EU/Biodiversa+ project), establishing collaborations with leading researchers worldwide. I have published 46 JCR papers, including high-impact D1 journals (Glob Chang Biol, Mol Ecol, Philos Trans Royal Soc B, Biol Rev, OneEarth, Ecology, Science), with increasing production and impact. My research integrates basic and cutting-edge approaches (physiological experiments, ecological modeling, genomics, meta-analyses) to understand organisms' adaptations in extreme environments (inland saline waters, alpine lakes and subterranean ecosystems) and the effects of global change on biodiversity. I address key ecological and evolutionary questions, such as how novel traits evolve, how lineages adapt to harsh environments or the drivers of the vulnerability of poor-dispersal taxa to climate change. Notably, I have contributed conceptually and methodologically to improving climate change vulnerability assessments in such species by revisiting current frameworks. I have also led applied research to inform ecosystem management (e.g. studying the impacts of multiple stressors in freshwaters), protected area prioritization and conservation strategies (e.g. assessing the effectiveness of conservation measures for protecting non-charismatic biodiversity). Committed to open science and dissemination, I actively engage with stakeholders (managing agencies of freshwater, cave ecosystems or protected areas) and actively organize scientific outreach and knowledge transfer activities at national and international levels. I have participated in 14 R&D projects (including one as PI) and worked as an independent postdoctoral researcher in all my host institutions, starting new research lines and securing funding. My leadership is also reflected in the main contributor role on >70% of my publications and leadership of key tasks within national and international project frameworks (designing and implementing experimental protocols and analytical workflows, coordinating field and laboratory studies, and integrating multidisciplinary approaches to address key research objectives). I combine research activity with university teaching and mentoring of PhD, master, undergraduate students and visitor researchers. My future research will consolidate a coherent program on the evolution of stress tolerance in organisms living under environmental extremes, advancing ongoing lines (e.g. subterranean adaptation) while integrating highly innovative approaches, such as host-microbiome interactions, transcriptomics, and novel eco-evolutionary frameworks, generating knowledge directly relevant for biodiversity conservation under global change. A Ramón y Cajal position would provide the stability and resources to establish an independent research team and competitively apply for national and international funding.

Resumen del Currículum Vitae:

I investigate how organisms adapt to multiple environmental stressors and how biodiversity can be conserved under global change. My research integrates ecophysiology, evolutionary biology, biogeography and conservation science, focusing on extreme aquatic and terrestrial environments. During my PhD, I used innovative molecular and physiological approaches to study aquatic insect responses to natural stressors (salinity, temperature, desiccation), offering new insights into adaptation to saline waters from arid regions. I later expanded this approach to alpine lakes and subterranean habitats, providing new perspectives on stress adaptation across diverse ecosystems.

As a postdoctoral researcher, my work is more oriented toward conservation biology, combining experimental approaches and ecological modelling to assess species vulnerability to climate change and inform area prioritization and conservation planning. Conceptually and methodologically, my research has contributed to improving climate-change vulnerability assessments for species with low dispersal capacity. I have also evaluated the effectiveness of protected areas worldwide, advocated for the inclusion of non-charismatic biodiversity in conservation planning, and led global meta-analyses on multiple stressors in aquatic ecosystems, including a highly cited study (>250 citations), offering actionable guidance for freshwater managers and stakeholders. These contributions have clear societal relevance, supporting evidence-based ecosystem management and informing conservation strategies under accelerating biodiversity loss and global change. Beyond these core lines, I address complementary questions on insect immunity, systematics, evolution and metacommunity dynamics.

My research achievements rely on an interdisciplinary skill set spanning molecular and physiological techniques, ecological modelling, phylogenetic methods and meta-analysis. I have authored 46 peer-reviewed JCR publications (17 first-author, 8 second-author, 6 senior-author; 34 Q1, 10 D1; >1,250 citations; h-index 20 in Google Scholar) and collaborated with >130 researchers from 60+ institutions in >20 countries. My international experience includes ca. 2 years of research stays in the USA, UK and Italy, supported by competitive fellowships.

I have led key research tasks in most of the 14 projects I have been part of and served as PI of a competitive project for young researchers. I have secured over €300,000 in competitive funding from research grants, PhD and postdoctoral contracts (FPU-UMU, Fundación Séneca, Juan de la Cierva, Junta de Andalucía), and project budgets, including support for international research stays. I have supervised a PhD thesis (plus 3 ongoing), 3 MSc (plus 1 ongoing) and 6 BSc dissertations (plus 1 ongoing) and hosted two international visiting students. My dissemination record includes 39 conference contributions (two invited talks) and over 30 outreach activities (talks, popular science articles, interviews, videos, etc.). I am an active peer-reviewer (20 JCR journals so far) and have evaluated international academic theses. I also engage in international research service, currently serving as secretary of the International Society for Subterranean Biology. I hold >400 hours of teaching experience (Ecology, Zoology) and ANECA accreditation as Profesor Contratado Doctor.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: MAS ROSELLO, JOSEP
Referencia: RYC2025-054677-I
Correo Electrónico: rosellomasjosep@gmail.com
Título: Photo-Enhanced FLP Catalysts for Metal-Free (De)Hydrogenations

Resumen de la Memoria:

My research career has been characterized by sustained international mobility, scientific independence, and interdisciplinary innovation at the interface of organic synthesis, catalysis, and chemical biology. I obtained my Chemistry degree at the University of Valencia (Spain) and completed a PhD at the University of Bristol (UK) on stereoselective functionalization of alpha-amino acid derivatives, including novel palladium-catalyzed arylation methodologies. I subsequently pursued postdoctoral research at EPFL (Switzerland) working on iridium-catalyzed asymmetric hydrogenation of oximes, contributing high-impact publications and an international patent, and at the University of Zurich investigating diazeniumdiolate-based compounds for wound healing and antibacterial applications.

Since 2022, I lead an independent research group at ETH Zurich as an SNSF Ambizione Fellow, focusing on the design of small-molecule catalysts for sustainable synthesis. Our primary work involves metal-free, frustrated Lewis pair-type catalysts for asymmetric hydrogenation of unsaturated substrates, and the development of tandem reduction/cyclization strategies to saturated heterocycles relevant to natural product and pharmaceutical synthesis. In parallel, we are developing bioinspired ligands for Earth-abundant metal catalysis, exploring visible-light-triggered reactions with potential biomedical applications.

Throughout my career, I have demonstrated leadership in securing competitive funding, supervising PhD, Master's, and undergraduate students, coordinating interdisciplinary collaborations, and translating fundamental research into applied contexts, including industrial partnerships.

My goal is to strengthen scientific research in Spain by bringing international experience to establish innovative programs in sustainable catalysis and organic chemistry.

Resumen del Currículum Vitae:

I obtained my Chemistry degree at the University of Valencia (Spain) and completed a PhD at the University of Bristol (UK) on stereoselective functionalization of alpha-amino acids and hydantoins, funded by an EPSRC Industrial CASE award in partnership with Syngenta Agrochemicals. My postdoctoral work at EPFL focused on iridium-catalyzed asymmetric hydrogenation of oximes, resulting in high-impact publications (Science, Angew. Chem.) and an international patent, followed by postdoctoral research at the University of Zurich on diazeniumdiolate-based therapeutics for wound healing and antivirulence applications.

Since 2022, I have led my independent group at ETH Zurich after securing a competitive SNSF Ambizione grant (CHF 831,764). My research centers on designing small-molecule catalysts for sustainable organic synthesis, including metal-free boron catalysts for asymmetric hydrogenation and reductive cyclizations, and bioinspired ligands for photocatalysis with Earth-abundant metals. I have supervised PhD, Master's, and undergraduate students, coordinated industrial collaborations, and contributed to 13 peer-reviewed publications, 2 preprints, 1 patent, and 18 conference presentations.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: MORENO YRUELA, CARLOS
Referencia: RYC2025-054962-I
Correo Electrónico: carlosmyruela@gmail.com
Título: Translatable targeting and therapeutic investigation of eraser enzymes

Resumen de la Memoria:

I am an independent postdoctoral researcher at the laboratory of Prof. Beat Fierz at EPFL, combining Chemical Biology disciplines towards the elucidation of enzyme mechanisms in biology and of new therapeutic strategies to cure human disease. My career, which has mostly taken place abroad at research institutions of international recognition, has allowed me to develop a highly interdisciplinary profile and become an independent research leader.

My pre-doctoral research at the University of Copenhagen (Denmark) focused on the development of assays and molecular probes to investigate the function of histone deacetylases (HDACs) in specific disease contexts. As such, I developed a peptide microarray technology to profile inhibitors in high throughput, I defined the optimal kinetic properties towards the treatment of frontotemporal dementia, and I unveiled the function of the orphan enzyme HDAC11 (Cell Chem. Biol., 2018, >100 citations).

After that, I performed a first postdoctoral stay at UCPH to investigate a newly found protein modification: histone lactylation. I led an international collaborative project with the University of Chicago and the East China Normal University, which afforded an important milestone in the field (Sci. Adv., 2022, >400 citations) and in the understanding that chiral modifications of proteins constitute separate signaling networks with interconnected regulation (Acc. Chem. Res., 2022 and Nat. Chem. Biol., 2025).

At my current position at EPFL in Switzerland, I am combining my previous experience in enzyme assay and inhibitor development with the technological capacities of my host laboratory: protein semi-synthesis and high-resolution biophysics. Here, I have established a powerful platform based on semi-synthetic protein substrates to (1) capture the interaction of enzymes and their substrates for high-resolution structural characterization via cryo-eM (Nat. Commun., 2025), and (2) sense enzyme activity in situ towards translatable high-throughput screening and mechanistic studies (unpublished). This, platform, which has so far enabled the study of chromatin-associated sirtuin deacetylase enzymes, will be fully taken advantage of for the study of the relatively unknown erasers of microtubule modifications at my future independent laboratory, as funded by a Starting Grant of the European Research Council.

The lines of research that my laboratory will develop are:

1. Translatable targeting of sirtuin activity towards cancer treatment. Taking advantage of the robust screening platform that I have developed for nucleosome-targeting sirtuin enzymes, we will develop activators of SIRT6 and inhibitors of SIRT7, towards the treatment of solid tumors.
2. Fluorogenic assays and probes for microtubule deacetylases. By accounting for the microtubule-specific activities of deacetylases, we will build a translatable screening platform and develop inhibitors as modulators of angiogenesis, cardiac function and neuronal regeneration.
3. Investigation of the luminal regulation of microtubules. We will develop protocols to modify the luminal loop of tubulin and solve the mechanisms of enzyme recognition by cryo-EM.
4. Spatiotemporal tracking of enzyme activity. We will use our semi-synthetic sensors to track enzyme activity within the biological environment, across the microtubule lattice and through chromatin.

Resumen del Currículum Vitae:

As an early-career researcher transitioning to independence, I have obtained >2.2 M € of funding as primary applicant, published 18 manuscripts including 4 as co-corresponding author (h-index 10), co-supervised multiple M.Sc. and Ph.D. theses, and co-organized scientific conferences and science communication events.

The main research projects that I have obtained are:

1. ERC Starting Grant, 1.668.750 €, as principal investigator
2. SNSF Swiss Postdoctoral Fellowship, 260.000 €, as researcher and primary applicant
3. IRFD International Postdoctoral Grant, 181.000 €, as researcher and primary applicant
4. Carsberg Foundation Visiting Fellowship at University of Oxford, 94.000 €, as researcher and primary applicant

Among my scientific contributions, the most impactful have been the identification of the erasers of histone lacyl modifications in cells (first-author Sci. Adv., 2022, 437 citations) and the deorphanization of HDAC11 as an eraser of fatty acid-derived lysine modifications (first-author Cell Chem. Biol., 2018, 115 citations). Lately, I have published an independent postdoctoral project in the structural basis of SIRT7 nucleosome engagement and substrate specificity (first and co-corresponding author Nat. Commun., 2025) and two invited research perspectives as co-corresponding author in slow-binding and covalent HDAC inhibitors (JACS Au, 2024) and in chromatin-specific functions of histone deacetylases (Bioch. Soc. Trans., 2024). These works represent an important advance towards targeting the dysregulated activity of deacetylase enzymes in cancer and other diseases.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have supervised 2 M.Sc. theses at EPFL, and co-supervised 1 Ph.D. and 6 M.Sc. theses at UCPH. My latest trainees, EPFL/UNIGE M.Sc. students Esther Calviño Sanlés (2024) and Polina N. Foteva (2025) are now continuing their research careers as Ph.D. students at the University of Lisboa and the University of Vienna, respectively. Prior to that, I co-supervised Daniela Danková during her Ph.D. studies at UCPH (2024), in the development of inhibitors to study HDAC11 function, which she published in JACS Au in 2025. Daniela is working as postdoctoral scientist in drug development at AstraZeneca in Sweden. I have also taken part of the doctoral thesis committee of José Manuel Castelló García (University of Barcelona, 2024).

I have co-organized a Gordon Research Seminar in High-Throughput Chemistry and Chemical Biology (USA, 2019), and I am now leading the initiative Pint of Science in Lausanne, which organizes a science dissemination festival yearly with >25 speakers and >500 attendees. In 2023 and 2024, I participated as event organizer. In 2025 and 2026, I am co-coordinating the entire festival in Lausanne, in charge of recruitment, fundraising, advertising and overall management. More importantly, we provide training in science communication to all speakers, from industry and academia, to promote their dissemination capabilities and to maximize the engagement of the general public.

All in all, I have a strong profile to become an independent research leader at the forefront of international research. With the help of an ERC Starting Grant and of a Ramon y Cajal fellowship, my laboratory will establish an independent interdisciplinary program to address current limitations in eraser research and provide key mechanistic information towards the treatment of disease.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: OYARZABAL EPELDE, ITZIAR
Referencia: RYC2025-054265-I
Correo Electrónico: itziar_oyarzabal@hotmail.com
Título: Additive Manufacturing of Molecular Materials

Resumen de la Memoria:

The research of I. Oyarzabal has focused on magnetic metal-organic materials, with potential applications in information storage and processing, quantum technologies, biomedicine, magnetic refrigeration and in several other developing fields.

As a PhD student at UPV/EHU, she worked on the so-called single-molecule magnets and in particular, she sought to enhance their blocking temperature and effective energy barrier for the reversal of the magnetization (i.e., time they stay magnetized) by rational chemical design. In 2017, she joined the Molecular Materials & Magnetism team at CRPP (France) thanks to a prestigious Marie Skłodowska Curie Individual Fellowship to work on new photoswitchable materials based on an electron transfer process. In 2019, she prolonged her stay in France thanks to a postdoctoral grant from the Basque Government. During this period, she focused on the development of post-synthetic modification strategies that took already existing molecule-based magnets to the next level. Since 2021, she is working at BCMaterials as an Ikerbasque Research Fellow, where she is developing molecular qubits for quantum technologies.

The proposed research line that will be carried out during the Ramón y Cajal project aims to study methodologies to implement molecule-based (conducting) magnets into devices and applications. The targeted compounds will consist of known or novel coordination polymers (CPs) featuring low-cost ligands and abundant metal ions and will be prepared either in-situ or before the additive manufacturing process, following two approaches: (a) a conventional approach, in which the CPs will be blended directly into polymeric matrices for the additive manufacturing process and (b) an innovative approach, where I. Oyarzabal will take advantage of the dual extrusion 3D inkjet printing technique and will mix polymerization mixtures containing metal precursors and ligands and will form the CPs during their processing.

Resumen del Currículum Vitae:

I. Oyarzabal graduated with a degree in chemistry from the University of the Basque Country (UPV/EHU) in 2011. She obtained her Ph.D. degree in 2015 at UPV/EHU with the designation of International doctor due to a 3 months stay in the University of Edinburgh and received the extraordinary PhD award given by UPV/EHU. In 2016, she completed a nine-month period of postdoctoral studies at UPV/EHU. From 2017 to January 2021, she worked as a postdoctoral fellow at the Molecular Materials & Magnetism research group led by Dr. Rodolphe Clérac, at Centre de Recherche Paul Pascal (CRPP, CNRS - University of Bordeaux), first due to a Marie Curie Individual Fellowship (2017 - 2019) and after due to a postdoctoral grant from the Basque Government. Since January 2021, she works at BCMaterials - Basque Center for Materials, Applications and Nanostructures, where she has started an independent research career thanks to an Ikerbasque Research Fellowship.

Since 2011, I. Oyarzabal has actively participated/is participating in 21 projects funded by UPV/EHU, Provincial Council of Guipuzcoa, Junta de Andalucía, Basque, Spanish and French Governments and European Commission. All these projects have resulted in 53 ISI papers (1,370 citations, h-index 22, Scopus) and a patent about "Anti-inflammatory gadolinium metal complexes based on diclofenac" (University of Granada and UPV/EHU, Participation: 10 %). In addition to the patent, her most relevant contribution to date is the development of a couple of metal-organic magnets with large coercivity and ordering temperatures up to 242 °C (published in Science as corresponding author, 2020). In order to communicate her results, during her career I. Oyarzabal has given 9 oral presentations and 10 invited talks in major conferences and workshops and has written 3 articles for a non-experienced public. She has also organized the "B&B 2021: BCMaterials - University of Bordeaux symposium" to promote new collaborations between BCMaterials and researchers working at the University of Bordeaux.

She has officially co-supervised 3 undergraduate, 4 master, 1 PhD and 1 postdoctoral students, and she is now supervising 2 master and 1 PhD students and 3 postdocs. In order to promote female participation in science, she has participated in several outreach activities such as Journée Filles et Maths (Bordeaux 2018), La Science Taille XX Elles (Toulouse 2018) and Emakumeak Zientzian Atzo eta Gaur (Bilbao 2024). She has also been recognized by Ikerbasque in its annual awards for outstanding female scientists.

To end up, she has evaluated several Marie Curie Individual Fellowships for the European Commission and beamtime proposals for the ESRF, been part of the evaluation committees of PhD theses and reviewed articles for well known journals (J. Mater. Chem. C, Dalton Trans., etc).



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: TOLOSANA MORANCHEL, ÁLVARO
Referencia: RYC2025-054989-I
Correo Electrónico: alvaro.tolosana.moranchel@gmail.com
Título: Aplicación de tratamientos foto- y fotoelectro-catalíticos para el tratamiento de aguas y desarrollo de electrocatalizadores y electrolizadores para la producción de hidrógeno y peróxido de hidrógeno

Resumen de la Memoria:

Soy Ingeniero Químico por la Universidad Autónoma de Madrid (UAM), donde obtuve el Premio Nacional al segundo mejor expediente en Ingeniería Química (2016) y el Premio Extraordinario de mi promoción (2014). Durante mis estudios, fui beneficiario de becas de excelencia y colaboración en investigación, lo que me permitió iniciarme en tareas científicas desde etapas tempranas.

Posteriormente, cursé el Máster en Ingeniería Química en la UAM y la Universidad Rey Juan Carlos, compaginando mis estudios con una ayuda de investigación. Gracias a un contrato FPU, realicé mi doctorado en Química Aplicada en la UAM (2014-2019), con mención internacional y calificación Cum Laude. Durante esta etapa, realicé estancias de investigación en Reino Unido, Alemania y Argentina.

Tras el doctorado, me incorporé como investigador postdoctoral en la Universidad de Ulster (Reino Unido), donde trabajé en un proyecto del programa H2020 enfocado en el tratamiento de aguas residuales en India. En 2021, regresé a España gracias a una Ayuda de Atracción de Talento Investigador de la Comunidad de Madrid, incorporándome al Instituto de Catálisis y Petroleoquímica del CSIC. En 2022 realicé una estancia en Francia (ICGM-CNRS) y en 2023 obtuve una nueva ayuda César Nombela, que me permite desarrollar mis propias líneas de investigación.

Mi trabajo se centra en el tratamiento de aguas mediante procesos de oxidación avanzada y en el desarrollo de sistemas electro- y fotoelectrocatalíticos para la producción y almacenamiento de energía, contribuyendo a los objetivos del Pacto Verde Europeo. He publicado más de 35 artículos científicos (índice h = 17, i10 = 25, +1000 citas), más de 30 presentaciones en congresos internacionales y soy coautor de cuatro capítulos de libro. He participado como moderador, miembro de comités científicos y organizador de congresos como SECV2022 y CCESC-2026.

He participado en 17 proyectos de investigación nacionales y europeos, con una financiación total superior a 1 millón de euros. Actualmente soy Co-IP de un proyecto estatal (177.000 €) y lidero una línea de investigación en sistemas foto-electroquímicos (397.000 €). He sido IP en propuestas aceptadas en los sincrotrones Diamond Light Source (Reino Unido) y ALBA (España), y codirector de tres contratos con empresas en el marco del programa Misiones CDTi (190.000 €). También soy co-IP de un proyecto financiado por la Fundación Naturgy (100.000 €) y coautor de una patente nacional concedida (P202130184).

Además de mi labor investigadora, he contribuido activamente a la formación de estudiantes, dirigiendo prácticas, TFGs, TFM (incluyendo estudiantes internacionales) y actualmente una tesis doctoral. He impartido más de 175 horas de docencia en la UAM y la Universidad de Ulster, y he participado en proyectos de innovación docente presentados en congresos especializados.

También me involucro en la divulgación científica, participando en eventos como La Noche de los Investigadores y Jornadas de Puertas Abiertas del CSIC, así como en entrevistas en medios como la revista Técnica Industrial.

Resumen del Currículum Vitae:

1. Producción científica y experiencia investigadora

Soy autor de 36 artículos científicos, 17 de ellos como primer autor, publicados en revistas de alto impacto como Applied Catalysis B (IF: 24.32) y Chemical Engineering Journal (IF: 16.74). Además, he publicado en otras revistas relevantes como Catalysis Today y Science of the Total Environment. En total, 28 de mis artículos se encuentran en revistas Q1. Mi producción científica ha recibido 1000 citas y tengo un índice h de 16 (Google Scholar). También he coescrito 4 capítulos de libro y presentado más de 30 comunicaciones (orales y pósteres) en congresos nacionales e internacionales.

2. Colaboraciones internacionales y financiación

He colaborado con investigadores de prestigio como el Prof. D. W. Bahnemann (Leibniz Universität Hannover), Dr. Pilar Fernández Ibáñez (Ulster University).

He obtenido financiación competitiva por un total aproximado de 660.000 €, incluyendo una beca de colaboración, una beca FPU, tres ayudas complementarias para estancias (2016, 2017 y 2018), y los programas Atracción de Talento 2020 (Modalidad 2) y Atracción de Talento César Nombela 2023 de la Comunidad de Madrid. He liderado cinco propuestas aceptadas para medidas de absorción de rayos X en los sincrotrones Diamond Light Source y ALBA. También he supervisado 3 Trabajos de Fin de Grado y 3 de Máster.

He sido co-investigador principal (co-IP) de tres contratos con empresas dentro de la convocatoria CDTi Misiones (MIP-20221044), con un presupuesto total de 190.000 €. Además, soy co-IP de un proyecto de dos años (100.000 €), ganador del primer premio de la Fundación Naturgy a la Investigación e Innovación Tecnológica en Energía. También soy IP de un proyecto estatal de generación de conocimiento (PID2023-152310OB-I00) con una financiación de 177.000 €.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

3. Contribución a la sociedad

Participo activamente en actividades de divulgación científica, como la Semana de la Ciencia (2021 y 2023) organizada por el CSIC, la Feria de la Ciencia de Irlanda del Norte y la Noche Europea de los Investigadores (2023 y 2024). Además, soy coinventor de una patente (P202130184).

4. Formación de jóvenes investigadores

He impartido más de 140 horas de docencia en la Universidad Autónoma de Madrid y más de 35 horas en la Universidad de Ulster, en grados de Química e Ingeniería. He supervisado un doctorando, 3 Trabajos de Fin de Grado y 3 de Máster (uno de ellos internacional). También participé en un proyecto de innovación docente, cuyos resultados presenté en el 5º Congreso de Innovación Docente en Ingeniería (2020) y en la 5ª Semana de Innovación Docente (Madrid, 2019).

Reviso artículos para revistas de alto impacto como Applied Catalysis A: General, Chemical Engineering Journal, Journal of Materials Science y Environmental Science: Water Research & Technology. Además, he formado parte del comité organizador del Congreso Nacional de la Sociedad Española de Cerámica y Vidrio (SECV 2022) y del comité científico del VI Encuentro de Jóvenes Investigadores de SECAT. También participé en el curso de "Técnicas de análisis y caracterización" organizado por el CSIC.

5. Otros aspectos relevantes

He recibido el Premio Nacional al segundo mejor expediente académico en Ingeniería Química (Ministerio de Educación, Cultura y Deporte, 2016), el Premio Extraordinario de Fin de Carrera (UAM, 2014), y el Premio a la Excelencia.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: ESTEVE FRANCH, FERRAN
Referencia: RYC2025-054245-I
Correo Electrónico: ferranesteve_10@hotmail.com
Título: Investigación en química dinámica aplicada a macromoléculas.

Resumen de la Memoria:

La trayectoria del Dr. Ferran Esteve se ha construido en la intersección entre la química orgánica, supramolecular, dinámica y biológica, con el objetivo de desarrollar sistemas químicos adaptativos capaces de modular y mejorar funciones biomoleculares. Tras una sólida formación en química orgánica, supramolecular y sostenible durante su BSc y MSc (UJI&UPV, 2013-2018), su investigación predoctoral se centró en la síntesis de macrociclos pseudopeptídicos y su aplicación en catálisis. Sus contribuciones más relevantes incluyen el desarrollo de metodologías sintéticas sostenibles utilizando herramientas supramoleculares, de una nueva métrica de impacto ambiental para las reacciones de macrociclización y catalizadores para la conversión de CO₂ a productos de alto valor añadido. Durante una estancia de investigación en Estrasburgo inició su trabajo en química dinámica, lo que dio lugar a publicaciones de alto impacto y sentó las bases de su etapa postdoctoral. Desde 2022, el Dr. Esteve desarrolla su investigación en el ISIS (Université de Strasbourg) en el grupo del Prof. Jean-Marie Lehn, donde ha consolidado su independencia científica mediante la obtención de dos prestigiosas ayudas individuales (Fundación Ramón Areces 2023 y MSCA-IF 2024). En esta etapa ha establecido una línea propia centrada en potenciar la eficiencia y estabilidad de reacciones de iminación en agua para emplearlas como herramientas de bioconjugación a macromoléculas. Sus avances en el uso de multivalencia supramolecular, efectos estabilizantes por proximidad y microcompartimentos han aumentado de forma significativa la estabilidad de las iminas en condiciones fisiológicas, y ha contribuido a descifrar principios selectivos en bibliotecas dinámicas complejas. Estos trabajos se han traducido en 21 publicaciones, muchas como primer y/o autor de correspondencia, incluyendo artículos en revistas de alto impacto internacional como Chem, J. Am. Chem. Soc., Chem. Sci. y Chem Catalysis.

Su producción científica evidencia liderazgo, creatividad y madurez: >50% de los artículos se publicaron sin sus directores de tesis, >80% en acceso abierto, y ha codirigido de forma informal estudiantes de doctorado, máster y grado en España y Francia. Ha participado en 24 congresos (7 orales, 4 invitadas) y su labor ha sido reconocida con varias menciones, entre ellas premios de la RSEQ, la acreditación de la ANECA como Contratado Doctor, el Premio Extraordinario de Doctorado y becas altamente competitivas. Su perfil internacional incluye experiencia en España, Francia, Irlanda y colaboraciones con grupos de referencia en bioconjugación, sistemas dinámicos, espectroscopia avanzada y materiales autoensamblados.

Su futura línea de investigación desarrollará procesos químicos adaptativos que permitan modular -e incluso generar- función en biomoléculas y materiales mediante química orgánica y supramolecular. Propone trasladar principios de regulación biológica, como las modificaciones postraduccionales de proteínas, a sistemas sintéticos que aprovechen la diversidad química. Su objetivo es generar biomoléculas y materiales capaces de responder y optimizarse en función del entorno, abriendo la puerta a estrategias adaptativas con impacto en el campo de la nanotecnología.

Resumen del Currículum Vitae:

El Dr. Ferran Esteve es investigador postdoctoral MSCA-IF en el Institut de Science et d'Ingénierie Supramoléculaires (ISIS, Université de Strasbourg), en el grupo del Prof. Jean-Marie Lehn. Desde 2023 ha desarrollado una línea de investigación propia centrada en la Química Covalente Dinámica aplicada a sistemas adaptativos y a la modificación selectiva de proteínas, integrando química supramolecular, síntesis orgánica y biología química. Su trayectoria ha sido respaldada por ayudas individuales competitivas (>250 k€), incluyendo la Fundación Ramón Areces y el programa MSCA.

Obtuvo el doctorado en Química Sostenible en la Universitat Jaume I (UJI) en julio del 2022, financiado con una beca FPU, donde diseñó macrociclos pseudopeptídicos para catálisis supramolecular. Su trabajo generó una patente española (concedida en 2024) y 10 artículos publicados en revistas de alto impacto internacional, todos como 1er autor y 2 como autor de correspondencia. Una estancia de investigación en Estrasburgo (3 meses) permitió iniciar su colaboración con el Prof. Lehn, originando una publicación en Chem (2022) y orientando su actual línea científica. Su tesis recibió distinciones como el Premio Extraordinario de Doctorado de la UJI y el Premio a la Mejor Tesis (RSEQ-STVAL).

Durante su etapa postdoctoral (2022-2025) ha impulsado avances clave en la reactividad de iminas en agua, autoorganización molecular y bioconjugación dinámica de proteínas. Estos trabajos han dado lugar a publicaciones de alto impacto, muchas como primer y autor de correspondencia, en Chem, J. Am. Chem. Soc. y Chem. Sci. (2023-2025), consolidando su liderazgo científico y su independencia.

Posee experiencia docente en grados y máster, reconocida con tres premios 'Excelencia Docente' (2019-2021) por la UJI. Participa activamente en divulgación y transferencia, organizando jornadas científicas (p. ej., 'Jornada de Transferencia Científica Betxinenca', 2025) y promoviendo iniciativas de comunicación con amplio alcance a un público menos especializado.

Ha demostrado una sólida capacidad de supervisión, co-dirigiendo 5 TFM, 4 TFG y 4 doctorados tanto en España como en Francia, que han generado múltiples publicaciones conjuntas. Su red colaborativa incluye grupos internacionales de referencia en Inglaterra, Francia y Alemania, entre otros.

En captación de recursos, ha obtenido y gestionado proyectos competitivos con un presupuesto acumulado superior a 300 k€, incluyendo la MSCA-IF (2024-2026), la Fundación Ramón Areces (2023-2024) y la FPU (2018-2022). Además, lidera propuestas actualmente en evaluación, como 'ERC Starting Grant 2025' y 'La Caixa Junior Leader Incoming'.

En conjunto, el Dr. Esteve presenta una trayectoria ascendente caracterizada por su independencia científica temprana, producción de alto impacto, liderazgo en proyectos internacionales y contribuciones relevantes al desarrollo de nuevas estrategias de química dinámica aplicadas a macromoléculas.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GHIRARDELLO, MATTIA
Referencia: RYC2025-055781-I
Correo Electrónico: mattia.ghirardello@gmail.com
Título: Precision glyco-tools for human diseases

Resumen de la Memoria:

My research program focuses on understanding and targeting aberrant glycosylation, a molecular hallmark of cancer and other severe diseases. To address this challenge, I have established three complementary and coherent research lines that integrate organic synthesis, glycochemistry, computational design, nanomaterials, and advanced glycomics. Together, these lines form a unified scientific vision aimed at developing chemical tools to elucidate glycosylation mechanisms and translate this knowledge into diagnostic and therapeutic innovations.

(i) Carbohydrate-processing enzymes and glycosyltransferase inhibition.

I study the molecular mechanisms of protein O-glycosylation with a particular focus on glycosyltransferases (GTs), whose dysregulation is tightly linked to cancer. My contributions include the development of chemical probes to dissect GT activity and substrate specificity, resulting in 10 publications. A key result is the first selective bivalent inhibitors of GalNAc-T2, developed as sole corresponding author, using an innovative dual-domain strategy that expanded the field's ability to achieve isoform selectivity.

(ii) Chemical and nanomaterial probes for immunological applications.

In parallel, I develop glycan-based and nanomaterial platforms for immune modulation and cancer intervention. This includes the synthesis of saponin adjuvants, carbon-dot nanoparticles for glioblastoma tissue detection, and the preparation of MUC1-derived antigens for cancer vaccine development, demonstrating potent therapeutic efficacy in vivo. I have also co-led the development of gold-nanoparticle vaccines with tunable antigen loading, offering new design principles for multivalent cancer vaccines. My global contribution to this field was of 6 original research articles.

(iii) Tools for glycan detection.

I developed several glycan detection labels based on the imidazolium tag (ITag) platform, a versatile mass-spectrometry-enhancing technology enabling sub-femtomole glycan detection in serum. I have coordinated several projects on the development of several generations of ITags, including potent glycan detection tools and sialic-acid-selective probes. These probes were successfully applied for the discovery of glyco-biomarkers involved in severe human diseases. These tools directly support precise analysis of glycan signatures associated with GT inhibition and disease progression. My global contribution to this field was of 6 original research articles.

My future research line unifies my expertise and the skills acquired along my research career with enhanced innovations by combining AI-driven GT inhibitor design, bivalent cyclopeptide platforms, and ITag-based glycomics for the identification of glycan fingerprints in cells and patient sera. This integrated strategy consolidates fully original research, enabling the development of selective GT inhibitors and new glycan biomarkers with diagnostic and therapeutic potential.

Resumen del Currículum Vitae:

I am a chemist specialised in carbohydrate chemistry, study of glycan-processing enzymes, glycan detection, and nanomaterials, with a consolidated international trajectory across Spain, and the UK. My training includes a BSc and MSc in Chemistry (University of Ferrara, Italy) and a PhD in Organic Chemistry (cum laude) from the University of Zaragoza, funded by a competitive FPU fellowship. During my PhD, I complemented my synthetic training with computational chemistry through funded international research stays at the CIB in Madrid.

My postdoctoral career has taken place in internationally recognised centres and competitive research environments. At CIC bioGUNE, within an ERC Starting Grant, I gained expertise in synthetic vaccine adjuvants and in vivo biomedical applications. I then moved to the University of Bristol for a three-year postdoctoral contract position funded by ERC and CRUK grants, where I developed the foundational imidazolium tag (ITag) technology for ultrasensitive glycomics, served as laboratory manager, supervised researchers, and contributed to translational work on glioblastoma detection in collaboration with clinicians and industrial partners. My subsequent MSCA-COFUND postdoc at the University of La Rioja expanded my research into carbon-nanodot probes, homogeneous cancer vaccines, and selective GT inhibition.

Since 2024, I hold an AECC Investigador fellowship at the BIFI Institute (University of Zaragoza), where I have initiated an independent research line focused on developing glyco-therapeutic and diagnostic strategies targeting aberrant glycosylation in cancer. This activity has already produced high-impact publications (Anal. Chem., ACS Nano, Nat. Commun.) and strengthened my national and international collaborations.

My scientific production comprises 35 publications, including 18 as first author and 8 as corresponding author, in top-tier journals such as Nat. Chem. Biol., JACS Au, Nat. Commun., Angew. Chem. Int. Ed., Chem. Sci., ACS Nano, and Anal. Chem. I have participated in 17 conferences, delivered invited talks, and carried out extensive outreach activities. Moreover I served as reviewer in international journals (Anal. Chemistry, Angew. Chem. Int. Ed., among others) and contributed as evaluator for the MSCA-COFUND Iberus Interdoc Programme in 2025.

I taught more than 32 ECTS of both laboratory and theoretical classes with positive evaluation, I participated in 1 "proyecto de innovación docente" and officially co-supervised 2 TFM and 4 TFG at Spanish universities. Additionally, I was accredited as "Profesor Contratado Doctor" by ANECA in 2024.

I have secured competitive funding (H2020/MSCA, AECC), including a contract with industrial partners, coordinated research activities, supervised junior researchers, and built a strong collaborative network across Europe, China, and the USA. My trajectory demonstrates a clear progression toward scientific independence, supported by the creation of original research lines, senior authorship, leadership roles, and successful project conception and execution.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: FONSECA GARCÍA, JAVIER
Referencia: RYC2025-054194-I
Correo Electrónico: fonsecagarcia.j@northeastern.edu
Título: Ensamblaje de Materiales Reticulares en Superestructuras Funcionales
Resumen de la Memoria:

My research career has centered on Reticular Materials—Metal-Organic Frameworks (MOFs) and Covalent Organic Frameworks (COFs)—and on Colloidal Science.

Reticular chemistry has transformed materials design by enabling the precise construction of MOFs and COFs from organic linkers and inorganic nodes through strong, directional bonds. More than 100,000 MOFs and over 570 COFs have been reported, a development rate unmatched by any other porous material family. These frameworks show exceptional potential in adsorption, separation, catalysis, sensing, nonlinear optics, magnetism, and drug delivery. However, despite their versatility, MOFs and COFs are typically obtained as powders that are difficult to shape and integrate into functional devices. Improving their processability is therefore essential to fully leverage their capabilities.

My work has focused on addressing this challenge by structuring Reticular Materials into functional superstructures.

At Northeastern University, I designed MOF sheets with tunable thickness and studied their self-assembly into bead-like superstructures with hierarchical porosity. These materials showed potential for CO₂ capture, selective adsorption of aromatic hydrocarbons, and electro- and photoelectrocatalysis.

As a postdoctoral researcher, I worked on transforming less practical MOF and COF subunits into functional materials, including MOF beads and COF-based superstructures. I developed MOF-based antimicrobial coatings that completely inhibited the transmission of Gram-positive bacteria, Gram-negative bacteria, and fungi under realistic touch conditions. I also investigated the assembly of COF colloids into ordered photonic crystal superstructures.

My current research focuses on the programmed assembly of MOF and COF particles into colloidal molecules. By precisely controlling the number, type, and arrangement of particles, I aim to create next-generation microsystems that integrate multiple functional materials within a single, well-defined structure.

Rationally designed MOF- and COF-based colloidal molecules with tailored architectures are poised to advance three key areas—catalysis, water purification, and medicine. In catalysis, multicomponent colloidal molecules can operate as tandem catalysts, with each particle mediating a different step in a cascade reaction. In water purification, they can be engineered so that each component selectively removes a specific contaminant, enabling comprehensive treatment in a single step. In medicine, these colloidal molecules can function as multifunctional therapeutic platforms in which each component plays a complementary role. Beyond these applications, MOF- and COF-based colloidal molecules may also serve as programmable building blocks for assembling higher-order superstructures, such as tunable photonic crystals or multifunctional membranes.

Resumen del Currículum Vitae:

I have gained personal and professional experience at 8 institutions in 4 countries, conducting research in Reticular Materials—Metal-Organic Frameworks (MOFs) and Covalent Organic Frameworks (COFs)—and in Colloidal Science. I am co-author of 19 peer reviewed publications in high-impact journals, serving as corresponding author on 11 and first author on 15. My work has an h-index of 12, 1,535 citations, an average journal impact factor of 16.2, and an average of 80 citations per publication. I have presented my research at 11 international conferences. My contributions have been recognized with international honors, including the Sichuan Province High-Level Foreign Talent Recognition. I have also obtained funding from the National Natural Science Foundation of China to lead a research project as Principal Investigator.

I completed my PhD under the supervision of Prof. Sunho Choi at Northeastern University (Boston, USA). My research focused on synthesizing MOF sheets and assembling them into superstructures. After my PhD, I joined CARTIF Technology Center (Valladolid, Spain) as a postdoctoral researcher, where I developed catalysts by incorporating multifunctional active sites into porous materials. I then joined ICN2 (Barcelona, Spain) as a postdoctoral researcher under the supervision of Prof. Daniel Maspocho. There, I worked on transforming less practical MOF and COF subunits into functional materials. During this period, I completed a one-month research stay with Prof. Jia Min Chin at the University of Vienna, investigating how electric and magnetic fields can direct the assembly of MOF and COF particles. I am currently a Senior Research Scientist at the IFFS at UESTC (Chengdu, China). My research focuses on the programmed assembly of MOF and COF particles into colloidal molecules.

I have co-supervised 3 Bachelor's, 3 Master's, and 2 PhD students, guiding them in experimental techniques and critical data analysis. I serve as a peer reviewer for JACS. As a Teaching Assistant at Northeastern University, I completed ~750 hours of undergraduate teaching and mentored high-school students through the Young Scholars Program. I also contributed to public science communication through The Mad Scientist Podcast.

I received a fellowship from Fundació Catalunya La Pedrera to pursue my Master's degree at Rovira i Virgili University. I was offered an FPI fellowship to pursue a PhD at ICIQ, but I chose to conduct my doctoral studies at Northeastern University, where I was supported as a Teaching Assistant. I received NSF travel funding during my PhD. Recently, I obtained funding from the National Natural Science Foundation of China to lead a research project as Principal Investigator.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

My scientific contributions have been recognized with the Sichuan Province High-Level Foreign Talent Recognition, awarded to researchers with at least ten first- or corresponding author Q1 publications in the past five years. I was elected a Full Member of Sigma Xi, The Scientific Research Honor Society. I received a ¥20,000 award from IFFS at UESTC for my first- and corresponding-author publication in JACS, and the Outstanding Student Research Award at the RISE Conference.

Beyond academia, I am co-founder of J2 Veritas Science, an initiative dedicated to reducing geographic and economic barriers to scientific innovation.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GAO, ZHAO
Referencia: RYC2025-055956-I
Correo Electrónico: zihao.rei.gao@gmail.com
Título: Advancing and Exploiting 3D Extra-Large Pore Zeolites

Resumen de la Memoria:

Zeolites are crystalline microporous materials with a wide range of applications, including catalysis, adsorption, and cation exchange. Historically, stable zeolites were restricted to pores of 0.5-0.75 nm, limiting their utility for larger molecules. The applicant has focused on developing new zeolites, particularly stable, silica-based zeolites with three-dimensional extra-large pore (3D ELP) channel systems of 1-1.5 nm. His work has significantly advanced fundamental research on zeolite structures: among the ~260 zeolites known to date, he has contributed to the development of 11 new zeolites over the past decade, including the HPM and ZEO series zeolites. The ZEO series of multidimensional extra-large pore zeolites (ZEO-1, ZEO-3, and ZEO-5) achieve the long-standing goal of stable silica-based multi-dimensional extra-large pores sought for more than 80 years in zeolite synthesis. ZEO-1 represents the first stable aluminosilicate zeolite demonstrating exceptional catalytic activity in petrochemical processes. The discovery of 1D chain silicates (ZEO-2) and the subsequent development of new zeolites by 1D-to-3D topotactic condensation (from ZEO-2 to ZEO-3) and interchain expansion (from ZEO-2 to ZEO-5) opened new avenues for zeolite research, which was praised as “click chemistry in zeolites” in a Science perspective. Two PCT patents have been transferred to a company in Jilin, China, in which he is the second inventor.

During his post-doctoral stage, his research has focused on clean, sustainable energy production using zeolites as catalysts and adsorbents. He has also conducted fundamental studies on extra-large pore zeolites and, for the first time, observed reversible structural changes associated with highly strained building units. He has published four papers as the corresponding author and contributed to several projects funded by US Department of Energy (DOE), US National Science Foundation (NSF), and Swiss NSF. He is co-principal investigator of a \$0.9 million three-year project, “Exploring Pure-silica Zeolites for PFAS Adsorption and Degradation”, funded by WTIIRA.

In the future, he will develop the design, synthesis and application of industrially important ELP zeolite porous materials by building on the transformative chemistry he developed during his PhD studies and post-doc training towards new materials with targeted catalysis and applications. His expertise in the preparation of ELP zeolites has already led to leading publications (two in Science and one in Nature) and has proven that the approach provides a significant new route to novel materials. He will demonstrate how significantly improved functional materials can be prepared and highlight their utility in important catalysis and environmental remediation applications. Given his international experience in leading research groups and supervising students in Spain and the US, and his track record as corresponding author, he is well placed to complete this research. Combined with the world-class infrastructure available at ICMN-CSIC, the foremost institution in Europe to undertake porous materials research, this project will produce both fundamental design principles for sustainable zeolite synthesis and new materials that address major global challenges, including clean energy conversion, wastes recycling, pollutant removal, and drug synthesis and delivery.

Resumen del Currículum Vitae:

Zihao Gao (30 y/o), also known as Zihao Rei Gao in his publications to avoid name duplication in Chinese, has worked in zeolite science since his undergraduate studies. He gained foundational synthesis and crystallography skills during his BSc at Nanjing University and Peking University in China. During his PhD, under the supervision of Prof. Miguel A. Camblor at the Material Science Institute of Madrid (ICMM), Spanish National Research Council (CSIC), he focused on zeolite synthesis and developing new zeolite structures. He is currently a post-doc at the group of Prof. Michael Tsapatsis at Johns Hopkins University (JHU) in the USA, where his work continues to advance the synthesis and application of zeolites.

The applicant's profile strongly aligns with the requirements for a Ramon y Cajal Fellowship in Spain, where he excelled during his PhD and aims to establish his future scientific career.

As scientific contributions in the last five years, he has a noteworthy track record, with publications in top journals such as Science (2 articles as co-first author), Nature (1 article as first author), Angew. Chem. (5 articles, including 3 as first author and 1 as corresponding author). His 29 publications (including 4 as corresponding author, 8 as first author, and 6 as co-first author) have gained >600 citations, with ~50% in the top 25% most cited worldwide and 93% in top 25% journals by CiteScore. This tendency shows the impact and the interest of his work to the international community working on zeolites. He has also actively presented his work at conferences with posters, oral presentations and invited talks. He has a role as first author in many of his publications and in the last period he is submitting his work as corresponding author. Besides, he is co-author of 2 PCT patents licensed and transferred to industry, which undoubtedly remark the applied potential of his research.

Regarding his role as PI in projects, the applicant is co-PI of a \$0.9 million three-year project focus on exploring pure-silica zeolites for PFAS adsorption and degradation, funded by WTIIRA. He is also co-PI of an ALBA-CELL proposal, funding three participants for an ALBA trip, host and measure in 2025, and co-PI of several successful proposals of Brookhaven National Lab (BNL), involving measurements of mail-in samples and/or travel to BNL to conduct the experiments. He also contributed to proposal writing efforts alongside his post-doc advisor. He is currently participating in several projects funded by US DOE, US NSF, and Swiss NSF. Complementing his leadership, it is worth mentioning that he is also official supervisor of a defended PhD. Besides, he also co-supervises two PhD and one master (MSc) students, and has mentored four bachelor (BSc) students.

The applicant's international experience spans China, Spain, and the USA, reflecting strong mobility and internationalization. His collaborative efforts across borders will undoubtedly help him keep on building a robust professional network. >75% of his work is co-authored with researchers in several countries. All of his publications affiliated with ICMN-CSIC and/or JHU are available through various open access platforms beyond the original



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

publishers. Papers and datasets are freely available through ChemRxiv (preprints), DIGITAL.CSIC, Zenodo, and CCDC, ensuring broad access for researchers and the public



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: RODRÍGUEZ MAYORGA, MAURICIO ANTONIO
Referencia: RYC2025-054510-I
Correo Electrónico: marm3.14@gmail.com
Título: Novel methods in quantum chemistry and condensed matter

Resumen de la Memoria:

I am a theoretical and computational chemist whose work is focused on the development of novel methodologies to describe the electronic structure accurately. I propose methods, theories, approximations, and algorithms that are implemented in software used by computational chemists, condensed matter physicists, and material scientists. This software is used by specialists to study, characterize, and design novel compounds and materials presenting properties of interest for the scientific community and/or with industrial applications for our modern society.

I am an expert in reduced density matrix functional theory. I proposed the relativistic extension of this theory in my Marie Curie project. I am also an expert in many-body perturbation theory (i.e., GW, RPA, Bethe-Salpeter Equation, etc) and its applications to molecular systems and condensed matter physics (solids). More recently, I also became an expert in ab initio methods for superconductivity (e.g., the Hartree-Fock Bogoliubov and the Bardeen-Cooper-Schrieffer theory). Most of my work is focused on extending the applicability of these methods and improving them. To this end, I have programmed all these methods in computational software (in C++ and Fortran) and contributed to libraries with my implementations. I am a contributor to several programs used for molecular and condensed matter calculations: DoNOF, MOLGW, ABINIT, DIRAC, BeDEFT, and QuAck. And, to some libraries used in major programs, e.g. the greenX library of the NOMAD project. In summary, I am a method developer.

For my research line, I am proposing to use RDMFT methods for studying superconductors in a fully ab initio non-mean field scheme (i.e., beyond the Hartree-Fock Bogoliubov method). To this end, I plan to incorporate the most recently developed RDMFT functionals into the ABINIT program. Also, I plan to include some relativistic interactions that have been overlooked when studying superconductors, which could shed some light on the mechanisms that govern the transition to the superconducting state in non-conventional superconductors. Let me remark that the implementation of RDMFT functionals in ABINIT will benefit many research areas, because a good cost-effective method able to treat strongly correlated electrons in large systems at a fully ab initio level is still missing in the condensed matter community. Hence, my implementation will open new avenues for several research lines (including, for example, heterogeneous catalysis based on materials composed of transition metals).

Resumen del Currículum Vitae:

I did my bachelor's studies at the University Granada (obtaining the degree extraordinary award), my master's at the University of Girona/Barcelona/Autónoma de Barcelona/Rovira Virgili (obtaining the master's extraordinary award), and my PhD at the University of Girona (in close collaboration with the Donostia International Physics Center-Donostia San Sebastian). My thesis, entitled "Reduced density matrices, development, and applications," was presented in 2018 with the economic support of an FPU scholarship. During my PhD, I spent 3 months in Strasbourg (France), where I worked under the supervision of Prof. E. Frommager in the development of embedding theories for density matrix embedding theory.

Later on, as a postdoctoral researcher, I have worked at 5 renowned international institutions: University of Zurich (Switzerland), CEA-Paris Saclay (France), Vrije Universiteit Amsterdam (The Netherlands) [with a Marie Curie Individual Fellowship], Institut Néel à Grenoble (France), and the Université Paul Sabatier Toulouse (France). My research has focused on different topics a) Machine learning applications, b) many-body perturbation theory methods like GW, RPA, etc. (for molecules and condensed matter physics), c) relativistic effects using the Dirac equation for heavy elements (including QED corrections), d) QM/MM embeddings for large-scale calculations using many-body perturbation theory, and e) superconductivity in non-conventional superconductors. Involving several implementations in software packages (e.g., DoNOF, ABINIT, MOLGW, BeDEFT, QuAck) and libraries (e.g., the greenX library of the NOMAD project).

I have published 29 papers (13 as a PhD student and 16 as a postdoctoral researcher, 7 as the corresponding author in Q1 journals, and 12 as first author). I have participated in 21 conferences and delivered 15 oral presentations (2 as an invited speaker). I have mentored 2 PhD students, 4 master's final projects (2 awarded with distinction marks), and 2 bachelor's projects (1 awarded with distinction marks). Finally, I also have participated in dissemination activities, presenting my work to last year's high school students in Spain.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: SORIA CARRERA, HECTOR
Referencia: RYC2025-055905-I
Correo Electrónico: h.sorias@gmail.com
Título: Fuel-dependent self-replication

Resumen de la Memoria:

During my PhD, I initiated a new research line in my group by combining synthetic polypeptides with polyoxometalates to create POMlymers, hybrid materials with antimicrobial and catalytic properties. This concept, which I conceived and developed, resulted in eight publications and established a research line.

As a postdoctoral researcher at the Technical University of Munich, I explored how chemical fuels endow matter with lifelike behaviors. I developed kinetic modelling workflows in Python, which have supported three publications and led to the development of an online modeling application. As a Humboldt postdoctoral fellow, I worked on primitive genotype-phenotype coupling in fuel-dependent synthetic cells. Here, a simple autocatalyst decreases its error rate inside the compartment, while simultaneously extending the compartment's lifetime. Published in Chem as co-corresponding author, this paper is a major step toward the de novo synthesis of life. This work has supported new international projects, including a grant from the Sloan Foundation. I have secured competitive funding at all career stages, including the prestigious Alexander von Humboldt Fellowship as PI, presented my work at leading international conferences (GRC Systems Chemistry, Origins of Life Conference), supervised Master's students and interns, and contributed to building analytical and computational infrastructure in my host lab. I actively engage in open science, code dissemination, peer review, and scientific outreach.

My goal for the following years is to develop the fuel-dependent self-replication. I aim to overcome product inhibition through fuel consumption-analogous to ATP-driven processes in biology. To achieve this, I will utilize chemical fuels to switch on/off ligation chemistries, develop kinetic models to quantitatively understand replication, and also generate a database with self-replicating properties. Unveiling the mechanism of self-replication has tremendous implications not only in understanding how life could have emerged but also in technological applications. For example, PCR is a technique that leverages self-replication.

Resumen del Currículum Vitae:

I earned my Ph.D. in Organic Chemistry at the University of Zaragoza (2022, Spain) under the supervision of Prof. Jesús Martínez de la Fuente and Dr. Rafael Martín Rapún, graduating Cum Laude. I was awarded the highly competitive FPU fellowship, which is given based on academic performance. During my Ph.D., I initiated a new line of research on polypeptides and hybrid antimicrobial materials, which remains an active area of research in the group. I also conducted a research stay in Prof. Lee Cronin's lab (Glasgow, UK), which broadened my expertise in mass spectrometry and Python programming for chemistry, skills that remain a core part of my research toolkit.

Since 2022, I have been a postdoctoral researcher at the Technical University of Munich (Germany) in Prof. Job Boekhoven's group, a leading lab in chemically fueled self-assembly with the ultimate goal of de novo synthesis of life. I have led the group's efforts in developing self-replicating molecules that can serve as a primitive genotype in synthetic cells. In addition to my main project, I implemented Python-based kinetic modeling and data analysis pipelines that have become core tools in the group. I also modernized analytical techniques, from HPLC to UPLC, and set up a mass spectrometer for oligonucleotides. I was awarded an Alexander von Humboldt Fellowship (2023-2025), one of Germany's most prestigious postdoctoral awards, which will enable me to tap into one of the largest alumni communities, from which I will recruit talented postdocs when establishing my own group.

To date, I have published 15 peer-reviewed articles in top-tier journals with more than 300 citations in total, including Chem (x2), Angew. Chem. (x4), Chemical Science (x2), and wrote two papers highlighting articles in Nat. Synthesis and Nat. Catalysis. I have two corresponding author publications. I led the research and writing process for my first-author papers (approximately 50%), underscoring my leadership capabilities. I have extensively collaborated on multiple publications, developing kinetic models in Python or building polymeric nanoparticles for in vivo experimentation. Furthermore, I have presented my work at 11 conferences, delivering oral presentations and posters. Importantly, two exclusive events, the Gordon Research Conference in Systems Chemistry (USA) and the Third Annual Origins of Life Conference (USA).

I have taught over 120 hours of laboratory courses, and in Munich I have supervised five interns, two Master's theses, and currently one Ph.D. student. I have also read, corrected, and mentored numerous Ph.D. theses along the way. Teaching has taught how to supervise people, manage work, and lead them towards the overarching project goal. I have collaborated closely with Prof. Boekhoven on grant writing, including an ERC-CoG and a Sloan Foundation proposal. I act regularly as a reviewer both independently and on behalf of Prof. Boekhoven in top-tier journals, including Nature Catalysis, Chem, and Nature Synthesis. I have co-organized a scientific conference (Young Researchers in Colloids-JICI) and helped with keynote speakers in Suprachem (Ulm, 2024). Beyond academia, I have participated in science outreach activities, such as Pint of Science and HiScore Science, aiming to make chemistry engaging and accessible to the public.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: BLOKHUIS, ALEXANDER
Referencia: RYC2025-055229-I
Correo Electrónico: alex_blokhuis@hotmail.com
Título: Topological Index Network Analysis (TINA)

Resumen de la Memoria:

From an early age, I have been fascinated with chemistry: I read university textbooks in high school and my last three years in high school I performed organic synthesis each Friday in Bert Meijer's lab. I participated in 2 national (4th, 1st) and international chemistry olympiads (2x bronze). To pursue chemistry as far as possible, Prof. Meijer advised I should also become a physicist.

With this aim, I obtained a triple undergrad (chem. Eng., applied physics at TU/e, theoretical physics), graduated in theoretical physics at l'École Normale Supérieure de Paris (premier physics institute). I pursued theoretical and experimental research in both chemistry. My Bsc thesis (Meijer lab and prof vd schoot) involving synthesis and characterization of supramolecular polymers and statistical physics of confined monomers, resolving open question on absent phase transitions.

With C. Thomas (Chimie Paris) I made Al-salen polymerization catalysts for green chemistry, using air-free conditions (glovebox, Schlenk). I demonstrated (computational chemistry and thermodynamics) that a desired monometallic complex could not be obtained; a bimetallic complex is formed instead, spurring lasting collaborations with computational chemists.

W. D. Kraft (Leiden) I tracked colloids on membranes. I made a tracking algorithm for 3D imagestacks (confocal microscopy), tracking multiple colloids on curved interfaces, and interface itself. The code ultimately became part of the widely used Trackpy package. I supplied expertise in colloid synthesis and organic chemistry. In Stuttgart, Bechinger Group, I investigated active and passive motion of colloidal Janus particles in viscoelastic fluids, using video microscopy, simulations (SDEs, Lattice Boltzmann), stochastic thermodynamics. Published in PRL.

My PhD (physical aspects of origins of life scenarios, w. D. Lacoste, P. Nghe, ESPCI Paris) involved nonequilibrium thermodynamics, complex systems, chemical reaction networks, compartmentalization. I performed experiments on recombinant RNA and the Formose reaction. My PhD allowed to combine my backgrounds to build new research lines. This resulted in 2 key publications on autocatalysis (PNAS, Nat. Chem) resulting in a new international community, seminar series and collaborations with leading young mathematicians (N. Vassena) and chemists (Y. Geiger, R. Pollice).

I pursued a Marie Curie in systems chemistry (Sijbren Otto, Groningen), a young field with new questions and phenomenology and no theory yet. I absorbed decades of results and identified foundations on which to build the theory: CRNs, phase separation and their observables. My work provided the first qualitative and quantitative explanation in the field, led to invited perspective to JACS and the establishment of a new experimental lab in Strasbourg by a collaborator and several D1 publications (2x Nat Chem, Chem, JACS), D1 submissions.

With another Marie Curie I joined T. Hermans in IMDEA Nanociencia, working on magnetic polymers, Oscillators, and laws of systems chemistry. My fundamental theories imply new analysis tools that dramatically increase Information extractable from chemistry experiments. In TINA, I wish to bring these implications fruition and transform the analytical tools chemists have at their disposal.

Resumen del Currículum Vitae:

I have designed, written and supervised five official full-time theoretical-experimental student graduation projects (3 Bsc, 2 Msc, 4x 3months, 1x 6 months) on replicators, coacervates, computational fluid dynamics, soft matter, self-assembly, stochastic thermodynamics. These projects received ample followup and one project already has resulted in a joint D1 publication (Nat. Chem.) with two of my students.

I have a proven track record of acquiring funding for my academic career from non-profits, philanthropists, industry and government bodies. I received two scholarships by the VNCI (Union of Dutch Chemical Industry) and have been sponsored by Heineken and Danone (2x Descartes scholarship of excellence). My PhD proposal was selected for funding in the IRIS program (Interdisciplinary and Strategic Research Initiatives) organized by PSL. My first postdoc (ESPCI) was funded by a philanthropic gift from scientist and entrepreneur Jonathan Rothberg. I acquired a Marie Curie fellowship for a 3-year postdoc in Groningen by writing an original research proposal. A presentation of an original new research line of analytical chemistry was selected for a postdoc position in the Thomas Hermans lab as part of a competitive call (ERC consolidator). My proposal based on this research line was awarded with a Marie Curie Individual Fellowship.

I have experience in building up new labs: I helped with setting up the Daniela Kraft lab during my internship and was one of two lab members that were the first to move to Madrid to Establish the new Hermanslab there (previously in Strasbourg). During the Covid lockdown in Groningen, I also built equipment to set up a lab at home and I made new equipment for microscopy and time-lapse video monitoring of hydrodynamics experiments for PhD students.

To streamline my research lines involving international collaborations I set up dedicated servers and an online collaborative wiki to deposit experimental data and theoretical results in modular and linked fashion, accelerating writing and result integration. I have authored

Publications:

15 peer-reviewed (7 1st, 5 2nd, 7 corr. author) in 8 D1,13 Q1 journals.

4 in submission (3 1st, 4 corr. author, 3 preprinted).

I have published in premier (D1) scientific journals across chemistry (3x Nat. Chem, 1x Chem, 1x JACS) Physics (2x PRL) and multidisciplinary journals (1x PNAS) both as an experimentalist and as a theoretician.

Conferences, Seminars:

attended >22 international conferences, invited speaker to >10 conferences & seminars.

Organizer of 2 seminar series: systems chemistry discussion meeting (monthly), ARN seminar (biweekly). Organizer of upcoming Lorentz Center conference on nonlinear dynamics and networks.



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Turno General

I performed outreach through the European Researchers' Night. On three occasions I gave lectures and chemistry demonstrations on the oscillatory BZ reaction to high school and university students. My outreach presentations and protocols are still used by the group. For open science I maintain a chemistry video library. I review for journals in Physics (PRL, PRX, PRE, Soft Matter) and Chemistry (JACS, Angew. Chem.).



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: BLANCO ANDRÉS, PABLO MIGUEL
Referencia: RYC2025-054532-I
Correo Electrónico: pablomiguel.blanco@udl.cat
Título: Modelado multiescala de macromoléculas y coloides en materia blanda y biológica: transporte, reactividad y aplicaciones

Resumen de la Memoria:

Mi trayectoria científica se centra en comprender la química física de macromoléculas y coloides en sistemas blandos y biológicos, conectando interacciones moleculares con propiedades a escala mesoscópica. Desde mi doctorado en Química Teórica y Modelización Computacional (Universidad de Barcelona, 2020) he desarrollado un programa independiente que integra simulaciones coarse-grained Monte Carlo y Dinámica Molecular con aplicaciones en biomedicina, medio ambiente y materiales blandos.

Durante mi periodo postdoctoral, he consolidado tres líneas de investigación complementarias: 1) transporte de nanopartículas bajo ultrasonidos en matrices biológicas, generando marcos teóricos multiescala para optimizar la entrega de fármacos; 2) reactividad y quelación de metales en macromoléculas y materia orgánica disuelta, con aplicaciones ambientales y agrícolas; y 3) desarrollo metodológico y software abierto que amplían el alcance y la reproducibilidad de simulaciones de materia blanda reactiva.

Mi carrera se ha caracterizado por la movilidad internacional y la colaboración con centros de excelencia (Noruega, República Checa, Alemania, Argentina), así como con la industria, consolidando una línea independiente y demostrando liderazgo en desarrollo de proyectos, supervisión de estudiantes y desarrollo de software científico de referencia.

Mi línea de investigación futura busca establecer en España un programa consolidado de modelado multiescala de macromoléculas y coloides, con cuatro objetivos principales:

- 1) Quelación de metales en polielectrólitos y materia orgánica disuelta, combinando simulaciones reactivas con validación experimental para predecir movilidad de nutrientes y contaminantes.
- 2) Transporte de nanopartículas en matrices extracelulares bajo ultrasonidos, integrando Dinámica Molecular, colisiones multipartículas y métodos hidrodinámicos para guiar protocolos de entrega controlada.
- 3) Nuevas estrategias contra la resistencia antibiótica mediante nanopartículas de oro funcionalizadas con péptidos, simulando su interacción con la pared bacteriana y optimizando diseño de vectores antimicrobianos.
- 4) Desarrollo de software y herramientas open-source (ESPresSo, pyMBE) para asegurar reproducibilidad y extensibilidad de la comunidad en simulaciones reactivas de materia blanda.

Resumen del Currículum Vitae:

Mi investigación se sitúa en la intersección de Química Física, Física de la Materia Blanda y Biofísica, centrada en comprender cómo las interacciones moleculares, equilibria químicas y crowding macromolecular determinan estructura, transporte y agregación de macromoléculas y coloides en sistemas blandos y biológicos. Para ello, desarrollo y aplico simulaciones moleculares Monte Carlo y Dinámica Molecular coarse-grained, combinando rigor teórico con relevancia experimental.

Obtuve mi doctorado en Química Teórica y Modelización Computacional en la Universidad de Barcelona (2020, cum laude, Doctorado Internacional), financiado por la beca FI de AGAUR, seguido de tres becas postdoctorales competitivas: Margarita Salas, Marie Skłodowska-Curie Individual Fellowship y Beatriz de Pinós (UdL). Estas estancias me han permitido establecer líneas de investigación independientes en sistemas macromoleculares reactivos, transporte de nanopartículas bajo ultrasonidos en matrices biológicas y quelación de metales en macromoléculas de interés ambiental.

He publicado 23 artículos revisados por pares (17 Q1), incluyendo 12 como primer autor y 9 como autor correspondiente, 2 capítulos de libro y 1 revisión, con más de 300 citas y un índice h de 11 (Google Scholar). Más del 70% de mis publicaciones se han generado desde 2021. Entre mis contribuciones destacan:

- 1) Primer mecanismo molecular de difusión de nanopartículas potenciada por ultrasonidos en hidrogeles.
- 2) Algoritmo eb-RxMC para formación reversible de enlaces covalentes en sistemas macromoleculares.
- 3) Resolución de errores de ruptura de simetría en simulaciones a pH constante.
- 4) Modelos para macromoléculas reactivas y difusión bajo crowding macromolecular.

Mi visibilidad científica incluye 2 conferencias invitadas en workshops internacionales y liderazgo en ciencia abierta: contribuyo al desarrollo de ESPresSo (>1000 citas) y fundé pyMBE, un software open-source reconocido por el Centro EuroHPC MultiXscale, coordinando >10 colaboradores en 5 instituciones.



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Turno General

Mi carrera refleja movilidad internacional y colaboración sostenida (España, República Checa, Noruega, Alemania, Argentina). He co-supervisado 10 tesis de máster, asesorado doctorandos, acogido estancias internacionales y impartido más de 230 horas de docencia en Química Física, Bioquímica y programación científica. Mi objetivo es consolidar un programa independiente en España sobre modelado multiescala de macromoléculas y coloides en sistemas blandos y biológicos.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: FERNÁNDEZ VILLAR, ZULEMA
Referencia: RYC2025-056807-I
Correo Electrónico: zulfervil@hotmail.com
Título: Supramolecular and dynamic chiral helical polymers

Resumen de la Memoria:

My scientific background spans multiple disciplines—including polymer science, organic chemistry, analytical chemistry, supramolecular chemistry and theoretical chemistry—enabling me to address research challenges from a multidisciplinary perspective. During my early scientific career, I gained expertise in designing and synthesising organic building blocks to construct supramolecular and covalent polymers with tailored stimuli-responsive properties. Understanding the behaviour of these materials requires precise structural characterisation, which also informs how their properties can be improved through molecular design. Accordingly, I developed extensive experience in characterising small organic molecules, covalent and supramolecular polymers, as well as higher-order aggregates, using techniques such as Nuclear Magnetic Resonance (NMR), Differential Scanning Calorimetry (DSC), Circular Dichroism (CD), Fourier-transform Infrared Spectroscopy (FTIR), Gel Permeation Chromatography (GPC), chiral HPLC, Dynamic Light Scattering (DLS), Atomic Force Microscopy (AFM), and Electron Microscopy (SEM and TEM). To further deepen my understanding of these systems, I incorporated computational tools (Avogadro, Spartan, Gaussian, PyMOL) and theoretical methods, including Density Functional Theory (DFT) calculations, which enabled me to analyse and visualise structural and energetic features in a clear and intuitive manner.

The main scientific contributions from my PhD are: development of novel conformational communication mechanisms in dynamic helical polymers (chiral domino effect); discovery of new helix induction mechanisms in dynamic helical polymers (chiral information harvesting); generation of blocky microstructures in supramolecular helical copolymers; deciphering complex supramolecular polymerisation pathways; and the development of multi-helical scaffolds that merge covalent and supramolecular polymers. During this period I could undertake a 3-month research stay, that resulted in two publications. This experience equipped me with novel scientific skills that I applied upon my return to Spain, enabling the establishment of a new research line.

After successfully defending my PhD, I joined the group of Prof. Gustavo Fernández at the University of Münster founded by a Xunta de Galicia Postdoctoral Fellowship. Shortly after my arrival I was awarded a Humboldt Postdoctoral Fellowship. My experience in advanced structural elucidation together with the experience of the group in supramolecular chemistry allowed me to contribute to the scientific community with: the elucidation of the origin of complex aggregation pathways for different chromophores (i.e., OPE, BODIPY and BOPHY derivatives); the role of solvent demixing in supramolecular polymerisation; and the systematic study of the influence of solvent, temperature, and mechanical agitation on supramolecular polymorphism for different assemblies (i.e., OPE and BODIPY derivative and Pd complex). During this period I implemented the use of theoretical calculations in the group while teaching PhD students.

I have a total of 17 publications in high impact journals (e.g., Angewandte Chemie International Edition, Journal of the American Chemical Society or Chemical Science) and I attended 17 conferences, to 7 of which I contributed with an oral presentation.

Resumen del Currículum Vitae:

I obtained my PhD degree in Chemistry in 2021 (cum laude, International Mention) under the supervision of Profs. Emilio Quiñoá and Félix Freire at the University of Santiago de Compostela (CiQUS), supported by a Xunta de Galicia Fellowship awarded in 2017. Over this period, I built expertise in organic chemistry (design, synthesis and characterisation of building blocks for supramolecular and covalent polymers), chirality (helical polymers), supramolecular chemistry (covalent polymer-metal ion interactions and non-covalent interactions within supramolecular polymers) and theoretical chemistry (DFT calculations), with the goal of developing new materials that combine the properties of dynamic chiral helical polymers and supramolecular polymers. The findings from this period lead to the publication of six articles in high-impact journals (e.g., Angewandte Chemie International Edition, Journal of the American Chemical Society or Chemical Science), four of them as first author, highlighting my commitment and contribution to these projects. My fellowship allowed me joining the group of Profs. Bert Meijer and Anja Palmans in 2018 at the Technische Universiteit Eindhoven (TUE-Netherlands) for 3 months. This collaboration resulted in two publications (Chemistry-A European Journal, Molecules) demonstrating my ability to rapidly adapt to different work environments.

After successfully defending my thesis, I secured a Xunta de Galicia Postdoctoral Fellowship and joined the group of Prof. Gustavo Fernández at the University of Münster (2022). Shortly after joining, in 2023, I was awarded with a Humboldt Postdoctoral Fellowship. Since then, I have worked on different supramolecular systems, which find application in smart materials and biochemistry, and contributed to the research activity of several PhD students. My scientific output during this time includes 10 articles in leading journals (e.g., Angewandte Chemie International Edition or Chemical Science), an article under revision (available in ChemRxiv) and two more manuscripts in preparation for submission in early 2026.

Over half of my publications are open access and I presented my work at 17 scientific conferences. I have engaged in several outreach activities, aimed to non-scientific audiences, and, more recently, I organised and performed in the 2024 Weihnachtsvorlesung at the University of Münster. I have also taken part in a science-outreach lecture, encouraging female high-school students to pursue careers in science. Furthermore, I organised an international seminar, mentored several BS, MS and PhD and trained different PhD students in theoretical calculations.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: ALCON ROVIRA, ISAAC
Referencia: RYC2025-055750-I
Correo Electrónico: ialcon8@gmail.com
Título: Computational modelling of radicaloid conjugated polymers and molecular-engineered nanoporous graphenes

Resumen de la Memoria:

Research trajectory:

I did my PhD in computational and theoretical chemistry at the Universitat de Barcelona (UB; 2014-18) which was focused on the study, via density functional theory (DFT) calculations, of radicaloid 2D conjugated polymers (r-2DCPs) based on triarylmethyl (TAM) radicals (R1). During that time I demonstrated the complex electronic structure of these r-2DCPs due to the existence of different competing electronic states (Nat. Commun. 2017).

After the PhD I conducted my first postdoctoral stay at the Technical University of Denmark (DTU; 2018-19). There I learned the Greens functions (GFs) method to simulate quantum transport in the so-called nanoporous graphenes (NPGs) built as 2D arrays of laterally bonded graphene nanoribbons (GNRs). At DTU I started the research line (R2) of molecular-engineered NPGs. Via GF simulations we demonstrated that the spatial distribution of injected currents in NPGs may be controlled via a molecular engineering of the inter-GNR electronic coupling, thus providing a means to design carbon-based nanocircuits (JACS 2019).

Following, I started a Humboldt fellowship at the Freie Universität Berlin (FUB; 2019-21), where I studied radicaloid 1D conjugated polymers (r-1DCPs) based on TAMs (R1) in collaboration with FUB hosts. The independence provided by the Humboldt allowed me to develop the research lines on r-2DCPs (with UB) and molecular-engineered NPGs (with DTU) resulting in a number of publications (e.g. Nat. Commun. 2021, Adv. Funct. Mater. 2021). During that time I also learned at FUB how to simulate 1DCP-based nanodevices under non-equilibrium conditions (i.e. under a source-drain potential bias).

In May 2021 I started a Juan de la Cierva fellowship at the Catalan Institute of Nanoscience and Nanotechnology (ICN2; 2021-24) to learn the modelling of quantum transport under disorder conditions using the so-called linear-scaling quantum transport (LSQT) techniques. I applied LSQT to study the transport properties of NPGs under electrostatic disorder, demonstrating the emergence of giant quantum transport anisotropy in some NPGs under such conditions (Nanoscale Horizons 2024).

Since October 2024 I am back at UB as a consolidated postdoctoral researcher, where I have led the research lines of mixed-valence r-1DCPs and quinoidal r-2DCPs. I have supervised three TFG students on these topics, and I have obtained one HPC (RES) project focused on the second topic as principal investigator, while actively contributing to teaching duties within the Chemistry BSc program.

Research line:

During the RyC I will study, via DFT and non-equilibrium GF (NEGF) calculations, the use of GNRs as electrodes to covalently contact redox-active organic molecules (ROMs). Such type of GNR-ROM-GNR devices are expected to be highly robust (covalent) and possibly generated (via bottom-up synthesis) with atomic precision. During the RyC I will study how the chemical structure of the molecular channel, the GNR type and their contact configuration determine the quantum transport through the junction. I will also evaluate how the source-drain bias and electrostatic gate affect the channel molecular states and the resulting changes on charge and spin current flow. Finally, I will evaluate the possible integration of multiple parallel GNR-ROM-GNR devices in covalent 2D-arrays (i.e. within NPG-like nanoarchitectures).

Resumen del Currículum Vitae:

I am a chemist (BSc) with training in organic synthesis and molecular electronics (MSc) and a specialization in computational and theoretical chemistry (PhD, 2014-18). My expertise combines the modelling of electronic and magnetic properties of organic molecules and carbon-based 2D materials using density functional theory (DFT) with the simulation of quantum transport at the nanoscale. I consolidated these skills during postdoctoral stays at the Technical University of Denmark (DTU; 2018-19), the Freie Universität Berlin (FUB; 2019-21) and the Catalan Institute of Nanoscience and Nanotechnology (ICN2; 2021-24), becoming proficient in the non-equilibrium Greens function (NEGF) method and the linear-scaling quantum transport (LSQT) techniques.

My research applies chemical design concepts to molecular-engineered carbon nanostructures, aiming to evaluate their potential for future carbon nanoelectronics and carbon-integrated molecular electronics. I have developed two complementary research lines: (R1) radicaloid 1D and 2D conjugated polymers and (R2) quantum transport in anisotropic nanoporous graphenes. I have contributed to 29 publications with nearly 700 citations (h-index 15/13 Scholar/WoS), being (co-)corresponding author in >40% and (co-)first author in ca. 66% of them. I have led studies published in JACS, Nature Communications, Advanced Functional Materials and Carbon, and recently co-authored a Nanoscale Advances review on NPGs. My dissemination record includes 17 oral (1 awarded) and 5 poster (1 awarded) contributions, plus an invited talk at the Graphene2025 Conference.

My trajectory has been recognized since my early academic years: obtaining the Outstanding Student Award during the BSc and the PhD with cum laude. As postdoc, I obtained competitive fellowships from Germany (Humboldt Research Fellowship), the UK (Newton International Fellowship) and Spain (Juan de la Cierva 2019, 1st position in Materials Science). I also received Outstanding Reviewer awards from RSC Advances (2021) and PCCP (2023).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have nearly three years of international research experience (PhD stay at Imperial College London, DTU, FUB) and during this time I co-supervised a Nanotechnology BSc student at DTU and participated in MSc teaching at FUB. My international collaborations with DTU, FUB, University of Lorraine and CNR (Italy) have resulted in 11 joint publications. Additional indicators of internationalization include mentoring at the TranSiesta School 2023 held at DTU, membership in the RSC Advances Reviewer Panel (since 2021; UK) and the Materials Research Society (2021; US) and my recent appointment to the Early Career Editorial Board of Nanomaterials (since September 2025; Switzerland).

My growing leadership is reflected in my increasingly frequent role as corresponding author in my publications, two awarded HPC projects (RES) as PI, and the supervision of three Chemistry BSc theses at UB. One of these resulted in a study currently under review in PCCP as my first last-author paper. I have served on MSc thesis evaluation panels at UAB, UB and BIST, reviewed over 100 manuscripts for 14 different journals (including Advanced Materials, Chem, Angewandte Chemie and Nano Letters), and evaluated grant proposals for the Czech Science Foundation and the Polish National Science Center.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: PICCONI, DAVID
Referencia: RYC2025-056107-I
Correo Electrónico: david.picconi@hhu.de
Título: Watching photochemistry happen: Quantum mechanical description of photochemical transformations and their spectroscopic observation

Resumen de la Memoria:

I am a theoretical chemist specialised in modelling photochemical processes (photoisomerisation, photoinduced proton/electron transfer, non-radiative relaxation, photodissociation, etc.). My research uniquely combines electronic structure calculations, used to construct realistic potential energy surfaces, with advanced high-dimensional quantum wave packet methods to simulate ultrafast (femto to picosecond) photoinduced molecular dynamics. A central aim of my work is to connect these dynamics with time-resolved spectroscopic observations.

I began in this field during my master's research, investigating nucleobase photostability and showing that π dark $n\pi^*$ states play a key role in DNA photoprotection. In my PhD, I developed quantum-mechanical approaches to model photodissociation reactions. Studying ozone, relevant to atmospheric chemistry, we explained the strong vibrational excitation observed experimentally in triplet oxygen as arising from quantum nonadiabatic electron-vibration coupling. In the second part of my PhD, I investigated pyrrole photodissociation, designing a strategy to predict wavelength-dependent kinetic-energy spectra of photofragments – the only fully quantum calculation of this observable for a molecule larger than 3 $\times$ 4 atoms.

During my first postdoc, I began developing my own methods and codes for multimode molecular wave packet simulations and time-resolved spectroscopic predictions. Using these tools, we fully characterised the features observed in pump-probe and four-wave-mixing spectra of dihalogens in rare-gas crystals, prototypical systems for studying condensed-phase dynamics, resolving long-standing interpretative debates.

In my second postdoc, I initiated collaborations with international networks performing time-resolved X-ray molecular spectroscopy at large free-electron-laser facilities. I led and continue to lead the theoretical work with Prof M. Gühr's group (German Synchrotron DESY). One project, published in Nature Communications, reported the first femtosecond time-resolved X-ray photoelectron measurement on a purely organic molecule (2-thiouracil), relevant to photodynamic cancer therapy. My simulations showed how this technique can reconstruct light-induced changes in the partial charge at a specific atom, directly linked to electronic-structure evolution and molecular reactivity.

Last year, I started my own subgroup at the Institute of Theoretical Chemistry, University of Düsseldorf. I independently developed general procedures to simulate ultrafast photoinduced proton and electron transfer, fully accounting for quantum-mechanical effects and linking these processes to their spectroscopic signatures.

In the future, I plan to: (i) automatise my computational procedures for systematic application to broad molecular classes; (ii) extend my photochemical models to include solvent effects; and (iii) benchmark approximate quantum-classical methods against exact quantum results.

Resumen del Currículum Vitae:

I graduated in Chemistry (MSc, 2012) at the University of Pisa, funded competitively by the Scuola Normale Superiore. My master project with Dr. Fabrizio Santoro (CNR) led to 4 papers and 2 conference talks. I then completed a PhD (2017) at the Technical University of Munich in Prof. Wolfgang Domcke's group, after having been selected for the International Max Planck Research School for Advanced Photon Science. My doctoral work produced 8 peer-reviewed papers (including a PCCP Hot Paper) and 4 conference talks.

From 2017-2019 I was a postdoc at the University of Frankfurt (Prof. Irene Burghardt), collaborating with Prof. Jeffrey A. Cina and contributing 4 papers, 1 book chapter, and 4 talks, including an invited talk in Telluride and a presentation at the prestigious Faraday Discussion.

In my second postdoc (2019-2022, University of Potsdam, Prof. Peter Saalfank) I worked independently on photoinduced proton and electron transfer and joined large international X-ray science projects at free-electron laser facilities. I led the theoretical components of several collaborations and co-wrote an accepted beamtime proposal at Elettra Synchrotron with M. Gühr, G. Cerullo and C. Vozzi. This period resulted in 5 publications and 4 talks, including a Nature Communications paper as corresponding author.

Since 2022 I have been an independent staff scientist in Prof. S. Faraji's group, first at the University of Groningen and now at the University of Düsseldorf, where I have initiated my own subgroup. My work focuses on quantum mechanical methods to simulate complex dynamical processes in molecular systems. In 2024 I co-authored a comprehensive review of state-of-the-art approaches for excited-state dynamics and spectroscopy, and in 2025 we released software enabling systematic comparison of nonadiabatic methods against accurate quantum dynamics. My subgroup, currently one PhD student and two bachelor's students, investigates quantum effects in photoinduced molecular processes and, more recently, molecule-plasmon coupling.

I have lived abroad for over 10 years and speak Italian, English, Spanish, and German. I have built extensive international collaborations, particularly with the experimental groups of M. Gühr (Hamburg) and J. Bredenbeck (Frankfurt).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I am author of 31 peer-reviewed papers and 2 book chapters, 71% as corresponding, last, or first author $\square$ including 3 single-author papers $\square$ demonstrating strong scientific independence. I have co-supervised 5 MSc/PhD students and taught multiple courses in general and physical chemistry, fully coordinating three. I was an invited lecturer at the Les Houches school on Quantum Dynamics and Spectroscopy.

I co-organised the conference High Dimensional Quantum Dynamics (Groningen, 2022) and a CECAM workshop on Nonadiabatic Dynamics (Zaragoza, 2025), and since 2023 I have been part of the scientific committee of the Les Houches conference on Quantum Dynamics and Spectroscopy of Functional Molecular Materials and Biological Photosystems.

I review for leading journals (Nature, Nature Communications, JCP, JPCL, PCCP, etc.) and evaluate national projects for the German (DFG) and Dutch (NWO) funding agencies.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas

Nombre: YUAN, XIAOJIAO

Referencia: RYC2025-055319-I

Correo Electrónico: yxjxjks@126.com

Título: Dr

Resumen de la Memoria:

My scientific trajectory has been driven by the ambition to develop molecularly engineered organic materials for the sustainable conversion of abundant molecules such as CO₂ and N₂ into value-added chemicals and fuels. After a solid training in physical chemistry and catalysis, I have progressively built an independent and coherent research line that bridges molecular design, conjugated polymers and covalent organic frameworks (COFs), advanced spectroscopy and electrochemical energy conversion.

I obtained my PhD in Chemistry in France, working on polypyrrole nanostructures as metal-free and hybrid photocatalysts. This early work demonstrated that conjugated polymers can act as active photocatalysts for pollutant degradation and hydrogen evolution, not merely as conductive supports. During this period, I acquired expertise in radiation chemistry, time-resolved spectroscopy, electron microscopy and photocatalytic reactor design, and I learned to coordinate multi-partner collaborations between CNRS laboratories and international groups.

In a first postdoctoral stay at a leading polymer institute (LCPO), I shifted from polymer nanostructures to well-defined donor-acceptor small molecules and oligomers. I designed and synthesized families of organic trimers, elucidated structure-property-activity relationships for photocatalytic hydrogen generation, and pioneered their integration into 3D-printed architectures. This work established key design rules (band positions, aggregation, wettability, device structuring) that underpin my current research philosophy: performance emerges from the combination of molecular structure and controlled interfaces across length scales.

As a MSCA and Juan de la Cierva fellow at ICIQ, I have extended this expertise to electrochemical CO₂ and N₂ activation. I lead projects on gas-phase and liquid-phase CO₂ reduction using self-assembled organic semiconductors, conjugated polymers and COF-based hybrids, and I contribute to the development of Fe/Mo molecular and single-atom catalysts for N₂ reduction and ammonia synthesis. By combining operando spectroscopies, theory and microkinetic modelling, I aim to unravel how local structure, electronic properties and reaction environment govern multi-electron reaction pathways.

The research line I propose to develop as an independent investigator builds directly on this trajectory. Its central goal is to create molecularly defined conjugated polymer and COF platforms that enable electrocatalytic C-N bond formation from CO₂ and simple N-containing feedstocks (including N₂), under mild conditions. I will engineer cooperative active sites and interfaces capable of simultaneously activating C and N sources, embed them in advanced electrode and membrane architectures, and establish mechanistic principles for coupled CO₂/N₂ transformations. This programme will position my future group at the forefront of sustainable electrosynthesis, while strengthening the host institution's leadership in molecular catalysis and functional organic materials.

Resumen del Currículum Vitae:

Dr. Xiaojiao Yuan is a chemist with a strong international trajectory in functional materials for sustainable catalysis. Her expertise spans the rational design of organic-inorganic hybrid systems, nanostructured semiconductors and single-site metal catalysts for energy conversion, including CO₂ and N₂ reduction and solar water splitting. With experience in China, France and Spain, >20 publications in leading journals (17 as first and/or corresponding author), two patents and substantial competitive funding, she is well positioned to lead high-impact projects at the interface of chemistry, materials science and catalysis. Her early training began with a Master's degree in Materials Science at Guangdong University of Technology (China), where she co-developed photocatalytic semiconductor materials for wastewater treatment, leading to a patent now exploited industrially (CN 106345496 B). Motivated by the societal relevance of sustainable technologies, she pursued a PhD in Physical Chemistry with Prof. Hynd Remita at Université Paris-Saclay (France). She designed and synthesized π -conjugated systems and overoxidized conducting polymers for visible-light water splitting, pollutant degradation and solar oxidation, establishing her reputation in visible-light catalysis and molecular material engineering. After her PhD, Dr. Yuan joined LCPO-Université de Bordeaux (France) as a postdoctoral researcher in the H2020-FETOPEN project "HyPHOE". There, she focused on π -conjugated donor-acceptor-donor organic trimers for visible-light H₂ production. She developed strategies to tune molecular aggregation and photophysics through side-chain engineering, leading to first- and corresponding-author publications in *Angewandte Chemie* and *Advanced Functional Materials* and setting new benchmarks for organic photocatalysts. This period consolidated her ability to connect molecular design, self-assembly and device-level implementation. Since 2022 she has been a researcher at ICIQ (Spain), first under the Juan de la Cierva fellowship. In 2023 she was awarded a Marie Skłodowska-Curie Postdoctoral Fellowship (HORIZON-MSCA-2022-PF), through which she launched an independent project on electrocatalytic nitrogen fixation and N₂ reduction. This work has already generated a European patent (EP25382652.3), an invited *ChemSusChem* review and a forthcoming research article, defining a new design paradigm in N₂ reduction catalysis for ammonia synthesis under mild conditions. In parallel, she has initiated a complementary line on molecularly engineered conjugated polymers and COF-based hybrids for CO₂ reduction, building a coherent platform for future C-N bond-forming electrosynthesis from CO₂/N₂. Overall, Dr. Yuan has over 21 peer-reviewed publications in journals such as *ACS Catalysis*, *Angew. Chem.*, *Adv. Funct. Mater.*, *ChemSusChem*, *Small* and *J. Mater. Chem. A*; two patents (one with industrial transfer in China and one granted in Europe); and recognition through competitive fellowships and awards, including MSCA PF and Juan de la Cierva. She has presented her work at numerous international conferences (MRS, E-MRS, C²Nano, etc.) and serves as reviewer for journals. She has mentored several MSc/BSc/PhD students in France and Spain, actively participates in outreach and science communication activity.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GÁMEZ VALENZUELA, SERGIO
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Correo Electrónico: sergiogamez@uma.es
Título: From Semiconductor Material Understanding to Device Innovation in Organic Electronics

Resumen de la Memoria:

I have followed a distinguished research trajectory across multiple internationally recognized institutions, which has allowed me to build a solid multidisciplinary skillset spanning in-depth characterization of thin-film semiconductors, quantum chemical modelling of their structural and electronic properties, and the implementation of advanced electronic devices.

During my PhD at UMA, I investigated how the degree of intramolecular conjugation and supramolecular organization influence charge transport and device performance in organic semiconductors, developing expertise in spectroscopic (IR, Raman, UV-Vis), electrochemical (cyclic voltammetry, spectroelectrochemistry), and microstructural (GIXRD, AFM) characterization techniques, as well as device fabrication (electro-optic modulators, OFETs) and quantum-chemical modelling at the DFT and TD-DFT levels. I conducted a 4-month research stay at Prof. Sabine Ludwigs's group (IPOC, University of Stuttgart, Germany), where I expanded my skills in electrochemical characterization of donor-acceptor chromophores with non-linear optical properties and their integration into electro-optic modulators and fluorescence probes for cell bioimaging. A subsequent 3-month stay at Prof. J. I. Martínez Ruiz's group (ICMM, Spain) enabled me to gain expertise in modelling periodic systems. I developed a new protocol in Quantum ESPRESSO to modelling 2D materials, which I have independently expanded over the years to metal clusters, COFs and perovskite/polymer systems.

After completing my PhD in 2023, I joined Prof. Xugang Guo's group at SUSTech (Shenzhen, China), where I spent nearly two years. I rapidly became the leading manager of the organic thermoelectrics (OTEs) lab, acquiring expertise in state-of-the-art doping strategies using surface-evaporated gold nanoparticles, quantifying doping efficiency via UPS, UV-Vis and EPR, and controlling these processes to fabricate high-performance OTE devices. I led several breakthroughs in n-doped OTEs, including: (i) a new dopant achieving the highest conductivity reported for molecularly n-doped OTEs; (ii) the highest ambient-processed n-type OTE figure-of-merit for (Patent PSU252025065); (iii) a new diketopyrrolopyrrole-based building block with outstanding OTE performance (Patent PSU252025060); and (iv) an ultra-efficient solution-processable doping technology yielding the record-high OTE power factor (Patent PSU252024063). Beyond thermoelectrics, I contributed to understanding polymer-additive interactions in organic solar cells, linking morphology to charge transport and device performance. This highly productive period resulted in 3 patents, 19 publications (7 first-author).

These achievements enabled me to secure competitive independent fellowships (Juan de la Cierva and Marie Skłodowska-Curie Postdoctoral Fellow). I am currently conducting my European MSCA project in Prof. Simone Fabiano's group at Linköping University (Sweden), where I am investigating the use of new betaine-derived, water-stable photocatalysts for high-speed, low-power conductance-based organic electrochemical neurons. This period has also expanded my expertise to include photolithography, printed-electronics deposition methods, and photocatalytic doping, complementing the thermally driven doping strategies I previously developed in China.

Resumen del Currículum Vitae:

I graduated in Chemistry from the University of Malaga (UMA) in 2016 and completed a Master in Applied Chemistry and Nanotechnology in 2017 with honors. In 2018, I was awarded the highly competitive FPU fellowship (FPU17/04908) to begin my PhD in Chemistry and Chemical Technologies at UMA, which I completed with Cum-Laude and international distinctions in 2023. My thesis, awarded as one of the Best PhD Theses by the GENAM group of the RSEQ, and the UMA Extraordinary PhD Award, investigated how supramolecular arrangements of organic semiconductors influence charge transport and device performance. For that, I developed a multidisciplinary skillset, gaining expertise in organic semiconductors characterization using spectroscopic (IR, Raman, UV-Vis, XPS, EPR), electrochemical (CV, and spectroelectrochemistry) and microstructural (GIXRD and AFM) techniques, along with device fabrication (electro-optic modulators and field effect transistors (OFETs)) and theoretical modelling of electronic and charge transport properties via quantum-chemical calculations at the DFT (Density Functional Theory) and TD-DFT (Time Dependent) levels. Research stays at the University of Stuttgart (4 months, Prof. S. Ludwigs) and ICMM of Madrid (3 months, Prof. J. Martínez Ruiz) strengthened my skills in electrochemical doping, conductance measurements, and developing a computational methodology for modelling periodic systems. I then completed a nearly two-year postdoctoral stay at SUSTech (Shenzhen, China, Prof. X. Guo), focusing on efficient molecular doping strategies for n(electron transporting)-type polymers in organic thermoelectrics (OTEs). This work led to 3 patents and 19 high-impact publications (7 as first author), including: (i) an ultra-efficient solution-processable n-doping technology achieving the highest n-type thermoelectric power factor to date (Patent PSU252024063); (ii) a new dopant providing record electrical conductivity for molecularly doped n-type OTEs; and (iii) a novel electron-deficient building block enabling the highest thermoelectric figure of merit (Patent PSU252025065). These accomplishments secured independent funding via the Juan de la Cierva (JDC2024-055129-I) and Marie Skłodowska-Curie (OASYS, 101208856) postdoctoral fellowships, with outstanding scores of 100% (for candidate) and 98%, respectively. I am currently at Linköping University (LiU, Sweden) to carry out the MSCA fellowship in Prof. S. Fabiano group, collaborating with the start-up Westra Materials to develop advanced materials and neuron-mimicking electrochemical devices. To date, I have authored 40 peer-reviewed publications (17 as first author) in top journals including Nat. Mater., Nat. Chem., Nat. Commun., JACS (3), Angew. Chem. Int. (3), Adv. Mater., Energy Environ. Sci. (2), etc. I have participated in 21 conferences (15 international), giving 9 talks (2 invited), and 12 posters, and served on the organizing committee of 3 high-impact international conferences in organic electronics. Academically, I have over 180 teaching hours, co-tutored 2 undergraduate theses (H. Galván and A. Reviriego) and guided 2 master thesis at UMA, co-supervised a master thesis in China (Y. Wei), and currently co-supervising a PhD at LiU (L. Calcaterra). I have contributed to 11 research projects (1 European as PI) and participated in 15 scientific dissemination activities.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: SÁNCHEZ ILLANA, ÁNGEL
Referencia: RYC2025-054425-I
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Título: Digital Twins of Lipid Oxidation to Guide Analytical Strategies for Oxylipins (OXYLIPTWIN)
Resumen de la Memoria:

My research trajectory lies at the interface of analytical chemistry, mass spectrometry, vibrational spectroscopy, and machine learning, with a strong focus on the chemical and analytical study of lipid peroxidation. Throughout my career I have combined methodological development, fundamental chemical insight and translational applications, generating contributions that are increasingly recognised by the metabolomics, lipidomics and biospectroscopy communities.

During my PhD (PFIS Fellow, rank 1/288) in a clinical environment, I integrated LC-MS/MS, FTIR, SERS and chemometrics to investigate oxidative stress biomarkers in neonatology, reporting the novel analytical methods in this context. A research stay at the LIMES Institute (University of Bonn) expanded my background in SELEX and chemical biology. As a Margarita Salas postdoctoral researcher at the Institut des Biomolécules Max Mousseron (CNRS-University of Montpellier), I specialized in lipid oxidation chemistry and LC-HRMS/MS and co-supervised a PhD thesis. There, I led the development of the largest publicly accessible MS/MS spectral library of oxylipins and its associated molecular-networking workflow, published in Scientific Data and now adopted by several international groups. This work has underpinned several international collaborations.

Since 2024, as a Juan de la Cierva Fellow at the University of Valencia, I have strengthened my expertise in vibrational spectroscopy, simulation of IR spectra, and machine learning. I currently lead two competitive R&D projects as PI (NEFROIR and ASNOL) and co-supervise multiple PhD theses. My recent contributions include Monte-Carlo-based IR simulation frameworks, multimodal PoC strategies for renal monitoring, and the first implementation of mzmime software on an HPC cluster for large-cohort untargeted oxylipin profiling.

My future research line aims to establish digital twins of lipid peroxidation as a new paradigm for model-driven analytical chemistry. These hybrid mechanistic-data-driven models will link oxidation mechanisms, multi-platform analytical signals (LC-HRMS/MS, MIR/NIR/Raman, UV-Vis, electrochemistry), and decision metrics for selecting oxylipins of interest and optimal analytical configurations. This framework aspires to move beyond empirical method development and towards predictive, transferable, and quantitatively grounded strategies. The line is conceived to evolve into an internationally competitive programme integrating chemical mechanisms, instrumentation, computation, and multimodal data analysis, and to serve as the foundation for future ERC-level research.

Resumen del Currículum Vitae:

I have developed a multidisciplinary trajectory in analytical chemistry, integrating metabolomics, mass spectrometry, vibrational spectroscopy and machine learning. My career combines methodological innovation, international experience, teaching, knowledge transfer and growing leadership.

Key elements of my profile include:

- ☐ More than 45 publications and 3 book chapters, with over 25% as first or corresponding author.
- ☐ More than 1460 citations and an h-index of 22.
- ☐ Release of FAIR datasets, analytical workflows and open-source code.
- ☐ Participation in more than ten competitive R&D projects, including two as Principal Investigator.
- ☐ Contributions to international collaborations, training activities and scientific societies.
- ☐ Experience in analytical consulting, technology transfer and expert-witness reporting.

My PhD, funded through a PFIS fellowship (rank 1/288), combined mass spectrometry, spectroscopy and chemometrics applied to biomedical research. This work resulted in methodological developments, applications in clinical studies, and contributions to the understanding of oxidative processes in biological systems. A subsequent research stay in Germany strengthened my background in chemical biology and aptamer-based methodologies.

As a Margarita Salas postdoctoral researcher at a CNRS-University of Montpellier laboratory, I specialized in lipid oxidation chemistry and advanced LC-HRMS/MS. My work contributed to large-scale analytical resources, collaborative data-analysis strategies and international initiatives in oxidized lipid research.

Since 2024, as a Juan de la Cierva Fellow at the University of Valencia, I have expanded my activity into vibrational spectroscopy, simulation-based approaches and machine learning for analytical chemistry. I am Principal Investigator of two competitive projects, co-supervise doctoral research and collaborate with clinical, academic and technological partners. Recent work includes the development of computational frameworks, multimodal analytical strategies and high-throughput data-processing workflows.

Overall, my trajectory reflects an emerging independent profile centered on the development of analytical methodologies, data-driven tools and collaborative research environments. My work combines rigorous experimental foundations with modern computational approaches, contributing to open, reproducible and translational analytical chemistry.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: VÁZQUEZ VÁZQUEZ, DANIEL
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Correo Electrónico: danielvazquez150791@gmail.com
Título: Digital Sustainability: Integrating Machine Learning, Optimization and Life-Cycle Assessment for Sustainable Chemical Process Design

Resumen de la Memoria:

Mi trayectoria investigadora se ha desarrollado en el ámbito de la ingeniería de procesos, la sostenibilidad y la optimización matemática, integrando metodologías de machine learning y modelización avanzada para el desarrollo de procesos sostenibles. Comencé trabajando en optimización multiobjetivo, reducción de objetivos y seguridad inherente durante mi doctorado, lo que dio lugar a varias contribuciones metodológicas aplicadas al diseño temprano de procesos. Estos trabajos me permitieron adquirir una base sólida en modelización, análisis de datos y algoritmos de optimización.

Mi etapa posdoctoral en ETH Zurich supuso un punto de inflexión. Allí inicié una nueva línea de investigación basada en técnicas de inteligencia artificial para el diseño de procesos sostenibles, especialmente mediante modelos híbridos y regresión simbólica. Estas metodologías permitieron obtener ecuaciones interpretables, mejorar modelos de sostenibilidad y optimizar procesos de manera más eficiente. Además, contribuí al desarrollo de metodologías para integrar los límites planetarios en el diseño de procesos y participé en estudios sobre hidrógeno verde, metanol sostenible y tecnologías de captura de carbono. Mantengo colaboraciones activas con varias instituciones internacionales y algunos de mis modelos siguen utilizándose hoy día en el grupo de ETH.

Desde mi incorporación como Profesor Contratado Doctor en IQS-URL, he consolidado mi independencia científica. Soy co-investigador principal del proyecto M-AD-NESS, donde lidero la modelización y la evaluación de sostenibilidad, y participo en otros proyectos centrados en estudios de cianotoxinas, materiales sostenibles y modelos predictivos basados en datos experimentales para el diseño de procesos sostenibles. También he supervisado numerosos trabajos de grado, máster y doctorado, y he ampliado mi red internacional con colaboradores en Europa, Estados Unidos y Brasil.

La línea de investigación que propongo se basa en desarrollar un marco de Sostenibilidad Digital para automatizar el diseño y la optimización de procesos químicos sostenibles. Pretendo integrar simulación rigurosa, aprendizaje automático, modelos surrogados, análisis de ciclo de vida y métricas de sostenibilidad absoluta dentro de un entorno único que permita optimizar procesos desde una perspectiva económica y ambiental simultánea y sistemáticamente. Este enfoque busca superar la fragmentación actual de herramientas y proporcionar un procedimiento capaz de evaluar, optimizar y rediseñar procesos complejos de forma automática. Los casos de estudio finales serán procesos relevantes para la industria química e industrial, tal y como producción sostenible de hidrógeno, metanol y cadenas de suministro químicas completas, contribuyendo a la transición hacia sistemas industriales más sostenibles.

Resumen del Currículum Vitae:

Soy Profesor Contratado Doctor en el Instituto Químico de Sarrià (Universitat Ramon Llull), donde trabajo desde 2023 en el departamento de Ingeniería Química y Ciencia de Materiales. Mi especialización se centra en la sostenibilidad, el modelado y simulación de procesos, así como en la optimización y el uso de técnicas de machine learning aplicadas a la ingeniería química. Soy Doctor en Ingeniería Química por la Universidad de Alicante (2020) y he desarrollado una trayectoria internacional relevante gracias a mi etapa como investigador posdoctoral en ETH Zurich.

Desde 2016, mi labor investigadora se ha orientado al modelado y la optimización multiobjetivo, la evaluación de la sostenibilidad y el desarrollo de modelos sustitutos basados en algoritmos de inteligencia artificial. Durante mi carrera he trabajado tanto en la reducción de la dimensionalidad de problemas complejos como en la automatización de evaluaciones de sostenibilidad y en el diseño de cadenas de suministro y procesos industriales más sostenibles mediante modelos avanzados.

He publicado 28 trabajos revisados por pares, 21 artículos y 7 capítulos de libro, con más de 450 citas y un h-index de 12. Mis publicaciones incluyen artículos en revistas de alto impacto como Nature Communications, ACS Sustainable Chemistry & Engineering, Sustainable Production and Consumption y Chemical Engineering Science. Una parte importante de mis artículos están en acceso abierto y todos incluyen datos accesibles, contribuyendo activamente a la ciencia abierta. También tengo un sexenio de investigación (2018-2023) concedido por la ANECA por la calidad y continuidad de mi producción científica.

He participado en 10 proyectos de investigación competitivos, tanto nacionales como internacionales. Actualmente soy co-investigador principal del proyecto M-AD-NESS, donde lidero el desarrollo de modelos de optimización y la evaluación de sostenibilidad de nuevas tecnologías para la producción de biometano. Además, colaboro en proyectos relacionados con la sostenibilidad hídrica, el desarrollo de cementos sostenibles, la monitorización ambiental mediante IA y el diseño de clústeres químicos sostenibles mediante regresión simbólica.

Mi trabajo también incluye una importante labor de transferencia tecnológica, con colaboraciones con empresas como MAHOU, DataHow y Roche Schweiz, referente a retos de optimización, modelado de datos y sistemas, y mejora de procesos industriales.

En el ámbito docente, imparto clases en grados y másteres de Ingeniería Química e Ingeniería Industrial, y he supervisado 3 TFG, 13 TFM y 5 doctorandos (uno actualmente, y cuatro durante mi estancia en ETH Zurich, aunque la supervisión allí era como postdoc y por tanto no oficial). Poseo acreditaciones docentes de la AQU y la ANECA, incluida la acreditación de Profesor Contratado Doctor (ANECA) y la acreditación de Recerca (AQU).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Mi trayectoria refleja mi compromiso con el desarrollo de metodologías innovadoras que integren sostenibilidad, optimización e inteligencia artificial en el diseño de procesos químicos e industriales, así como con la formación y acompañamiento de las nuevas generaciones de ingenieros e investigadores.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: SALINAS SANCHEZ, GERARDO
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Correo Electrónico: gerardo.salinassanchez@enscbp.fr
Título: Magneto-(Bio)electrochemical induction

Resumen de la Memoria:

I have published 78 articles in international peer-reviewed journals; 27 as first author and 24 as corresponding author. I have performed 2 research stays; one at the Max Planck Institute for Intelligent Systems (Stuttgart, Germany), and one at the University of Milano. I have successfully supervised 4 students; one bachelor student of the Universidad de Guanajuato in Mexico, 2 master students in the University of Bordeaux, France, and 1 PhD research stay from the Universidad Complutense de Madrid, Spain, and currently I'm supervising a master student from the Universidad de Guanajuato, Mexico.

Line of research to be developed

Since the discovery of electromagnetism, the interconnection between magnetic and electric fields remains one of the most interesting aspects of nature. In electrochemistry, such a synergy has been commonly used to study complex physico-chemical processes involved in a wide range of applications. Recently, I applied for the first time magnetoelectrochemical concepts to the field of self-electrophoretic swimmers to boost their kinetic energy. The local electric current, present in such a self-electrophoretic system, allows predicting the possible formation of an intrinsic magnetic field within the device. Moreover, by taking advantage of the sophisticated design of a solenoid type-shaped object, it is possible to amplify the intensity of such a chemically induced magnetic field. Based on this observation I want to generalize this synergy between internal and external magnetic fields for a large variety of unconventional electrochemical systems. This should allow improving the kinetic energy of dynamic devices, based on the chemical induction of a magnetic field, leading to an overall amplification of the reaction kinetics of different electrochemical processes. Furthermore, I want to extend the Faraday law of induction, in order to develop a novel and so far unexplored type of wireless electrochemistry. Thus the main goal of the research project is to study in depth the novel concepts of (bio)chemically induced electromagnets and wireless magnetoelectrochemical induction, exploring its applicability in different (bio)electrochemical processes. Due to the novelty of the different magnetoelectrochemical concepts, the project is expected to have a high academic impact, providing a different view of well-known concepts in electrochemistry, and thus opening a whole set of new research lines.

Resumen del Currículum Vitae:

Since the beginning of my scientific career, my research was dedicated to molecular electrochemistry, in particular to the synthesis and characterization of conducting polymers. In this context, I focused my attention during my PhD on their use in the field of electroanalysis, in particular for the quantification of heavy metal ions in hydroalcoholic mixtures (Anal. Chem. 2018, 90, 11770-11774). After obtaining my PhD degree, I joined the group of Prof. Alexander Kuhn as a postdoctoral fellow. During my years as a postdoctoral researcher, I have been involved in different topics ranging from the electrochemistry of conducting polymers and the design of self-propelled swimmers with complex functionalities, to electroanalysis and bipolar electrochemistry. This is reflected in the different peer-reviewed articles by the co-authorship with physicist, biochemists or biologists and organic or polymer chemists. In the last four years, I focused my attention on the study of magneto-electrochemical processes and their relevance in different fields of science. In particular, I directed my research towards the study of the synergy between electric and ionic charges, involved in an electrochemical process, and magnetic fields. I have presented my work in the form of oral presentations at different international conferences, even as an invited speaker by the Mexican Society of Electrochemistry (Mexico), the University of Guanajuato (Mexico), the Vidyasirmedi Institute of Science and Technology (Thailand) and the Institute of Molecular Science (France). In 2022, based on the quality of my scientific work, I was promoted to the Level I of the National Research System, which is one of the three highest recognitions for a scientist given by the Mexican government. Since 2018 I continually act as external referee for multiple international journals i.e. Electrochimica Acta, Journal of Solid State Electrochemistry, Macromolecules, ChemElectroChem, Scientific Reports, ACS Nano, Analytical Chemistry and Microchimica Acta. I have published 78 articles in international peer-reviewed journals; 27 as first author and 24 as corresponding author. In addition, the independence of my research is demonstrated by 63 publications where I am in the list of authors without my former PhD supervisor, Prof. B. A. Frontana-Urbe and 7 publications without my postdoctoral supervisor, Prof. A. Kuhn. Furthermore, in recent years I have taken the initiative to propose different research projects and to supervise the involved students, which has resulted in publications where I am the corresponding author (i.e., Adv. Sci., 2024, 11, 2306635, Chem. Eur. J. 2024, 30, e202400078, Small, 21, 2025, e00778). In particular, I introduced the field of magnetoelectrochemistry to the group of Prof. Alexander Kuhn, which is reflected by the first example of the possible use of the magnetohydrodynamic effect for the efficient propulsion of self-electrophoretic macro- and micro Janus swimmers (J. Am. Chem. Soc., 2021, 143 12708-12714) and the very first examples of chemically driven electromagnets (Angew. Chemie Int. Ed., 63, 2024, e202408198, Chem. Sci. 16, 2025, 13291-13297). A considerable part of my results was published in high-impact factor journals i.e. Chem. Sci., Angew. Chem. Int. Ed., J. Am. Chem. Soc., Nat. Commun. and Nat. Chem.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: POZO MÍGUEZ, IAGO
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Título: Chemically Synthesized Wires for Quantum Technologies: Hybrid Nanographenes
Resumen de la Memoria:

The miniaturization of technological components is reaching the size of a few nanometers, where quantum effects become dominant. This opens possibilities for quantum technologies. However, the development of such technologies is hindered by the lack of suitable multifunctional materials. The current strategies for increasing material functionality typically rely on merging electronic and magnetic motifs by mixing non-discrete materials. These approaches are intrinsically limited by the inherent introduction of defects in materials fabrication, which detrimentally affect reproducibility and tunability.

As an innovative solution, I propose exploiting the interplay between organic electronics and molecular magnetism in graphene-like materials. Specifically, I target hybrid nanographenes that present two main components: i) inorganic spin centers, which provide magnetic functionality; and ii) conjugated pi-systems, able to mediate magnetic communication and to participate in electron transport processes, essential for enabling electrical readout in a device. This concept aligns with recent advances in spintronics and low-dimensional materials, at the forefront of efforts to integrate magnetic behaviors with electronics in multifunctional carbon-based platforms. Building on my preliminary data (obtained during my Marie Curie Fellowship) on the synthesis of coordinating graphenoids, I will develop synthetic methodology to access specific hybrid nanographenes and leverage them to unravel design principles for tuning magnetic couplings and quantum performance in these materials. I will thus identify synergistic effects between magnetism in inorganic complexes and in graphene (d-, f-, and pi-magnetism). For the first time, pi-conjugated systems will be studied as non-innocent quantum wires. This project will establish hybrid nanographenes as a new class of electromagnetic materials with precisely tunable magnetic properties and an innovative platform that supports the advancement of quantum technologies.

During my PhD, I obtained excellent training in organic chemistry, particularly in the synthesis of nanographenes, and collaborated with world-class physicists on organic electronics and advanced microscopies. These experiences broadened my education and sparked my curiosity about technology-oriented fields. As postdoctoral researcher, I learnt techniques of molecular magnetism, i.e. SQUID magnetometry, EPR and paramagnetic NMR spectroscopies, and applied them to understand chemical structure/quantum property relationships in porphyrin derivatives.

I will apply this personal approach to graphene-like materials, pioneering novel reactivity pathways that enable the construction of specific hybrid nanographenes. Through this project, I aim to unravel clear design principles for the rational development of multifunctional hybrid materials, that support the advancement of quantum technologies.

Resumen del Currículum Vitae:

My research is focused on the development of carbon-rich materials of technological interest. My overarching ambition is to attain precise control over the structure/property relationships in these materials, enabling the design of compounds that meet all the requirements for quantum technologies.

I received my PhD from the USC, working at CiQUS under the supervision of D. Pérez and D. Peña on the SYNTHESIS of nanographenes where, among others, I have improved the synthesis of the iconic kekulene. Further, I participated in a collaborative study with L. Gross (IBM, Zürich) and J. Repp (U. of Regensburg, Germany), experts in ADVANCED MICROSCOPIES, on controlling selectivity of a chemical reaction at the single-molecule level by applying voltage pulses of different sign and intensity. This was published in Science (front cover), highlighted in several media, and drove us to win the EVC Research Prize. This period of my career yielded 12 articles in journals such as Science and JACS.

In 2020, I joined L. Bogani group (Materials, U. of Oxford) to learn MAGNETISM and ELECTRONICS, including single-molecule electron transport, SQUID magnetometry, and EPR spectroscopy. In 2022, I moved to the group of H. L. Anderson (Chemistry, U. of Oxford), where I was the leader of an international collaboration with experts, such as M. Bennati (U. of Göttingen, Germany), and members of the Bogani group. We synthesized porphyrins with paramagnetic metal ions and studied their quantum performance. So far, we have published 1 article in Chem and 1 review in Trends Chem. In both, I am first and corresponding author.

In 2024, I came back to USC to start my independent career, supported by the Pérez/Peña group, local and international collaborators, with a Marie Skłodowska-Curie Fellowship. I am co-supervising 4 students: 1 PhD, 2 Master students and 1 undergraduate. The preliminary results are of interest for Quantum Technologies, and I am using them to secure additional funding: i) RSC Collaborative grant (5,856 £) co-PI with I. Roncevic (U. of Manchester, UK), an outstanding theoretician. This project funds reciprocal visits to stimulate our collaboration. ii) CiQUS SYNERGY-CALL 2025 (20,000 £) co-PI with E. Sotelo, who leads a research group and heads the biotech start-up Celtarys Research. This grant fosters collaboration among researchers at CiQUS. In it, we are supplying nanographenes to Sotelo's group to evaluate their performance as fluorescent tags for pharmacology. iii) CiQUS DISRUPT-CALL 2025 (1,500 £) PI, in which we are building on my MSCA results to strengthen the synthetic foundation of my research proposal.

In summary, during my PhD, I obtained excellent training in organic chemistry, particularly in the synthesis of nanographenes, and collaborated with world-class physicists on organic electronics and advanced microscopies. These experiences broadened my education and sparked my curiosity about technology-oriented fields. As postdoctoral researcher, I learnt techniques of molecular magnetism, i.e. SQUID magnetometry, EPR and paramagnetic NMR spectroscopies, and applied them to understand chemical structure/quantum property relationships in porphyrin derivatives. Currently, I am



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Turno General

developing a new class of molecular materials, HYBRID NANOGRAHPHENES, that will offer the tunability and multifunctionality required by quantum technologies.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: SANCHIS GUAL, ROGER RAFAEL
Referencia: RYC2025-055509-I
Correo Electrónico: roger.sanchis@uv.es
Título: Colloidal hybrid nanoparticles: From chemical design to catalytic applications

Resumen de la Memoria:

My research interests lie at the intersection of nanoscience, colloidal chemistry and catalysis, where I develop hybrid nanomaterials using colloidal chemistry to guide their design and enhance their intrinsic properties for catalysis and biomedicine.

During my Ph.D., I designed and studied hybrid nanomaterials displaying interesting magnetic and electrocatalytic. I developed experimental colloidal protocols to integrate gold nanoparticles in coordination polymers. In this regard, I was able to achieve different combinations of gold nanoparticles with Prussian Blue analogues and spin crossover systems, forming core@shell and core@satellite nanostructures. The intimate contact between both components in these structures can give rise to exciting synergies. For example, one of these systems was evaluated as an electrocatalyst for the oxygen evolution reaction, where the gold core enhanced the electrochemical performance of the coordination polymer shell, while the latter prevented the oxidation of the core.

After my Ph.D., during my stay at ETH, I expanded my expertise in colloidal chemistry to microrobotics and piezoelectricity. I developed hydrogel-based magnetic microrobots with magnetic nanoparticles homogeneously distributed within the microstructure. By selecting appropriate capping agents, the magnetic nanoparticles became more colloidal stable in the hydrogel, permitting a more efficient manipulation in biological media by using magnetic fields. Building on this platform, I incorporated piezoelectric nanoparticles into the microrobots, which can generate reactive oxygen species in water (piezocatalysis) upon mechanical stimulation. This enabled the development of piezoelectric-magnetic microrobots capable of dissociating protein aggregates under ultrasound. I also demonstrated that these ultrasound-induced electric fields can accelerate the azide-alkyne Huisgen cycloaddition, establishing a novel piezoelectrostatic catalytic approach. Moreover, I investigated the stability of colloidal nanoparticles composed in biologically relevant environments.

In parallel, I independently collaborated with the group of Prof. G. Abellán (ICMol) by studying the electrochemical properties of hybrid Ni and Co based layered hydroxides for water splitting catalysis, where the effect of the crystallographic structure was systematically analysed. This parameter significantly influences their electrochemically active surface area and inherent catalytic activity, thereby affecting the electrochemical performance. Currently, I develop environmentally friendly piezocatalytic-coordination polymer hybrid materials capable of treating contaminants in wastewater and selectively targeting cancer cells. Through this research, I aim to address key challenges in sustainable catalysis and biomedicine by employing colloidal synthesis to facilitate the formation of heterostructures with tunable composition and morphology, and suitable properties.

Resumen del Currículum Vitae:

I obtained a BSc in Chemistry from the University of Valencia (2014) and an MSc in Electrochemistry from the University of Córdoba (2015), joining Prof. F. Vicente's group to work on the electrochemical detection of nitrates in water. Then, I completed a Ph.D. in Nanoscience and Nanotechnology at ICMol supervised by Prof. E. Coronado and Dr. M. Coronado-Puchau, advancing the synthesis of hybrid nanostructures composed of gold nanoparticles and coordination polymers. I developed colloidal protocols to control their morphology and explored emerging synergistic properties for magnetic and catalytic applications. My thesis, defended in 2021, received a RSEQ prize for best thesis in colloid and interface science.

Thereafter I undertook a two-year postdoctoral stay (2022-23) at ETH Zurich with Prof. S. Pané, where I extended my expertise in colloidal chemistry to biomedical microrobots and piezocatalysis. I integrated functional nanoparticles into microrobots and explored colloidal piezoelectric nanoparticles, resulting in 9 publications (3 as first author and 2 as corresponding author). In 2024, I returned to ICMol, where I lead a research line on hybrid piezocatalytic materials based on Prussian Blue analogues for catalysis towards water remediation and biomedical applications.

Over these years, I have published 27 peer-reviewed articles (13 as a first author, 3 as a corresponding author) in top-tier journals (40% D1, >85% Q1), accumulating over 1200 citations with an h-index of 17. In addition, I have co-authored 2 patent applications. I have presented my work at various national and international conferences through 15 oral presentations (5 as an invited speaker) and 5 poster presentations.

From the beginning, I have been supported by several competitive fellowships and grants, including a MSc collaboration grant, an FPU Ph.D. scholarship, Margarita Salas and CIAPOS postdoctoral fellowships, and recently a Santander postdoctoral grant (4000€). These opportunities allowed me to lead and contribute to a variety of research projects with different Principal Investigators across multiple institutions, demonstrating my ability to attract funding and to work effectively in interdisciplinary teams.

I have mentored students at multiple levels. I co-supervised a Ph.D. thesis (S. Azeem, 2025), two MSc theses (M. Ubach and M. Redondo, 2025), and I am currently supervising a Ph.D. student (J. Alda). I have also served as a teaching assistant at the University of Valencia (21,7 ECTS). As a peer reviewer, I have contributed to the evaluation of scientific publications for materials science journals such as Dalton Trans., Nanoscale and Chem. Commun. I am also member of the scientific committee of the upcoming 2nd Early Career Symposium on Advanced Molecular Materials (Valencia, March 2026).

Beyond research, I contributed to a chapter on nanomaterials for a White Paper, reflecting my interest in connecting scientific advances with societal and industrial needs. Moreover, I actively participate in outreach activities like the "Expociencia festival" and the "Ciència Emergent" project, and I have written 5 outreach articles in Spanish and Catalan.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: PERALES RONDÓN, JUAN VÍCTOR
Referencia: RYC2025-055963-I
Correo Electrónico: prjuanvict@gmail.com
Título: Electrocatalysis for synthetic fuels and chemicals and use of in-situ and operando technique for electrocatalytic studies

Resumen de la Memoria:

My research career began with the development of my doctoral thesis in the field of electrocatalysis for the study of reaction mechanisms. After this period, I completed a postdoctoral training focused on the development of in-situ techniques such as Raman for the study of the electrochemical interface, followed by three more periods in which I consolidated the use of SERS in analysis, as well as the development of catalytic materials for the reaction of nitrate reduction in ammonia. With all this background, I joined CIAIE as a senior researcher, leading a research group dedicated to the development of electrocatalysis for synthetic fuels and chemical products (e-CATfuels). During this last phase, I have consolidated as an independent researcher, demonstrated in the preparation of different project proposals and funding acquisition at regional, national and European level. Additionally, I am currently co-tutoring three PhD students, who are working on the development of materials for the reduction of nitrate in ammonia and the development of in-situ techniques such as Raman or UV/Vis spectroscopy for the study of electrocatalytic reactions.

In line with this research and considering my previous experience in the use of plasmonic materials, a new line of research is being proposed within the framework of the "Ramón y Cajal" fellowship. This will be focused on the study of Plasmon assisted electrochemical nitrogen reduction to ammonia (PA-eNRR).

The biggest challenge in realizing ammonia synthesis is breaking the extremely strong triple bond of N_2 , which has a bond dissociation energy of 945 kJ mol⁻¹. This is the rate-limiting step in the ammonia synthesis by eNRR and typically requires harsh conditions. Among the existing strategies, the plasmonic effect promises to be a solution for providing sufficient energy in the form of "hot electrons" or local heating in the areas immediately adjacent to plasmonic materials, which would help facilitate the breaking of N-N bond. The combination of plasmonic effect in an electrocatalytic system is called surface plasmon-assisted eNRR (PA-eNRR), and would enable the electrochemical ammonia synthesis with a higher efficiency and selectivity at a lower energy cost.

Coinage metals such as Au, Ag, and Cu are well known to have plasmonic properties. It should be noted that these materials are not effective catalysts for HER, thus favoring selectivity towards the eNRR in aqueous or protic media. However, on their own, plasmonic materials do not exhibit significant activity towards the hydrogenation of nitrogen, so it is necessary to combine these materials with those that exhibit marked electrocatalytic activity, so that their surface facilitates the hydrogenation of nitrogen.

The general objective of the research line is to carry out a comprehensive study of PA-eNRR.

To achieve this general objective, the following specific objectives are proposed:

Objective 1 (O1). Synthesize and characterize plasmonic/electrocatalytic materials for PA-eNRR.

Objective 2 (O2). To study the reaction mechanism of PA-eNRR using SEC techniques.

Objective 3 (O3). Evaluate the optimal nanoplasmonic/electrocatalytic material for PA-eNRR and testing in an electrolytic cell.

Resumen del Currículum Vitae:

I am currently a Senior researcher at the Iberian Centre for Research in Energy Storage (CIAIE) in Cáceres, leading the research group centred in the use of electrocatalysis for synthetic fuels and chemicals (e-CATfuels). My research field focuses on the fundamental study of electrocatalytic reactions using well-defined surfaces and metal nanoparticles, on the use of in-situ and operando techniques to study of electrocatalytic systems and the application of such catalysts in real electrolytic systems (electrolysers). In my current role as a group leader, I supervise 3 PhD students working in the field of nitrate to ammonia conversion using Cu-based electrodes as well as the development of new substrate for SERS and EC-SOERS applications. During my period at CIAIE, I have secured funding at the regional, national and European level. I am the supervisor of two different MSCA projects, Plasmonia centred in the plasmon assisted electrocatalytic ammonia synthesis and UAS-CO₂R, focused in the study of CO₂ electroreduction using single atom catalysis. I have also been awarded the project INTERGAMP, focused on the interdisciplinary study of green ammonia synthesis, integrating different electrochemical technologies. More recently, I have been awarded the research project PLASMMONIA, funded by the Regional Government of Extremadura, intended for the study of the electrochemical reduction of nitrogen to ammonia assisted by the surface plasmon resonance effect. In this project, I am the principal investigator, coordinating and executing the activities proposed on it.

Related to my internationalization and mobility, I have carried out different postdoctoral stays at the national and international level. My first stay was carried out in the Laboratory of Instrumental Analysis at the University of Burgos, under the supervision of Dr. Álvaro Colina and Dr. Aranzazu Heras. In this group, I gained experience in the use of Raman and UV/Vis absorption spectroelectrochemistry (SEC). I have also participated in the development of a new commercial instrument for analysis (Metrohm-DROPSSENS, SPELEC-Raman®) and developed/described a new SERS-like phenomenon called EC-SOERS. After that, I moved to develop my second postdoctoral stage in the University of Alcalá, under the supervision of Prof. Alberto Escarpa. In this group, I worked on the development of micromotors with plasmonic layers that can be used for SERS detection. After that, I moved to Brno (Czech Republic) to develop a postdoctoral period under the supervision of Prof. Martin Pumera, working in the development of 3D printed electrodes for ammonia production. I consolidated a research line in that lab, centred in the study of electrochemical nitrate to ammonia conversion. Subsequently, I was awarded a "María Zambrano" fellowship to work in the Laboratory of Instrumental Analysis at the University of Burgos to work in SEC applied to electrocatalytic systems. As part of this period, I opened a new research line centred in the application of SEC to the study of relevant electrocatalytic reactions, such as ammonia synthesis (from nitrate and N₂) and CO₂ reduction reaction.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Throughout my scientific career, I have authored 36 scientific publications, being the corresponding author in 8 of them, which demonstrates my ability to lead original research works.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GOTI, GIULIO
Referencia: RYC2025-054820-I
Correo Electrónico: giulio.goti@gmail.com
Título: Radical platforms for C-glycosylation chemistry

Resumen de la Memoria:

Giulio Goti is a fixed term Assistant Professor with expertise in organic synthesis spanning from carbohydrate chemistry, radical chemistry, catalysis, and photochemistry. After his PhD training he undertook postdoctoral studies in several international research centers including CIC biomaGUNE (Spain), ICIQ (Spain), CNR-ICCOM (Italy), and the University of Padova (Italy). Throughout his career he has authored 21 peer-reviewed publications in high IF journals including Nat. Chem. (x1), Angew. Chem. Int. Ed. (x4), Chem. Sci. (x1) and 1 book chapter (RSC). Major research interests include the synthesis of glycomimetics, the combination of organocatalysis with photochemistry for the enantioselective synthesis of chiral molecules, the use of Pd-catalysis for the preparation of luminescent materials with potential use in agrivoltaic settings and the development of sustainable photocatalyzed protocols. To support his research he has attracted funding for three research projects for a total of over €360,000.

Throughout his career Giulio has attended 22 international conferences and schools (held in Italy, Turkey, Spain, The Netherlands, UK, Denmark) where he has contributed 10 oral communications and 13 poster communications. Recently he has been invited to give 2 seminars in the Universities of Milan and Padova. In Padova, he has been part of the Organizing Committee of Photocat24 – School of Photochemistry: from Photocatalysis to Photobiology that attracted over 180 participants from more than 20 countries among PhD students, young researchers, and 16 world-leading experts in the field. Moreover, in collaboration with Thieme he has actively organized the joint Editorial Board Meeting of Synthesis and Synlett at the Department of Chemical Science of Padova, 22-24 May 2025.

During the years he has strengthened his independence and enhanced his mentoring abilities through the supervision of several Master's students and PhD students. He has been the Master's thesis supervisor of Alessia Marrese, who graduated in September 2024 with a thesis entitled "Three-component radical strategy to aryl C-glycoside bioisosteres", and he is currently PhD co-supervisor of Alessia Marrese and Simone Baldon. In addition he has served as an active reviewer for Angew. Chem. (since 2025), Chem (since 2021), ACS Cent. Sci. (since 2025), Chem. Commun. (since 2024), among the others. He has been one of the external evaluators of the PhD thesis of Martina Mamone "New photo and nanocatalytic systems for application in organic synthesis" (thesis defence 25/02/2025, University of Trieste, Supervisor Prof. Maurizio Prato).

Since December 2022 Giulio is Assistant Professor at the Department of Chemical Sciences of the University of Padova. Here, he has initiated a research line focused on the development of innovative strategies for the radical functionalization of saccharides. In particular, his scientific goal is to exploit the energy of light for the mild generation of reactive radical intermediates, thus providing new routes to access uncharted C-glycosides with unprecedented stereoselectivities. The results of this ambitious research program are expected to establish new paradigms in C-glycosylation chemistry, paving the way for new developments in the chemical, pharmaceutical, and medical fields.

Resumen del Currículum Vitae:

During my scientific career I have received strong training in diverse fields of synthetic organic chemistry, from carbohydrate chemistry to modern activation strategies in photochemistry and catalysis. I was first exposed to the chemistry of carbohydrates during my PhD studies at the University of Milan. My thesis work focused on the synthesis of novel glycomimetic antagonists. Here I was the responsible of three research projects, designing and performing the experiments collaborating with internationally recognized scientists. Part of my PhD work (3 months) was conducted as visiting student at CIC-biomaGUNE, Donostia, (Spain) in the laboratory of Dr. Niels Reichardt where I acquired important skills in the chemoenzymatic synthesis of oligosaccharides.

I then undertook post-doctoral studies at ICIQ in Tarragona (Spain) in the field of asymmetric catalysis and photochemistry, acquiring independence and maturity in addressing scientific problems. My work focused on implementing photochemical processes with chiral organocatalysts, enabling the enantioselective synthesis of compounds that are challenging to obtain through conventional thermal routes.

In 2020, I was awarded a Giovani@RicercaScientifica research grant (€56,250) issued by CARIPT Foundation to lead the SOLAR-LEAF project at ICCOM-CNR, Florence. My contribution consisted in conceptualization, design, and performance of experiments. In addition, I reinforced my leadership and management skills directly coordinating the collaboration with the two research teams of Prof. Andrea Pucci (University of Pisa) and Prof. Adalgisa Sinicropi (University of Siena). The project involved a Pd-catalyzed protocol for the synthesis of innovative luminescent materials with potential application in agrivoltaic systems.

In December 2021 I was awarded a MSCA Seal of Excellence@Unipd fellowship (€100,000) to conduct post-doctoral studies at the University of Padova and broaden my knowledge in sustainable photocatalytic methodologies. Importantly, I took part in the development of a photocatalytic method for the synthesis of difluoro bicycloalkanes, a new class of hybrid bioisosteres. Throughout this project, I co-supervised 2 PhDs (Giorgia Barison and Tommaso Bortolato) and a master student (Alfredo Rauli) and contributed to plan and perform experimental work.

Finally, I won a Young Researchers - Seal of Excellence fellowship (€150,000) funded by the European Union - NextGenerationEU, taking position on 20th December 2022 as fixed-term Assistant Professor at the Department of Chemical Sciences of Padova. Here I have started my own research line that combines my expertise in carbohydrate and radical chemistry to develop innovative sustainable methods for the functionalization of saccharides.



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Turno General

Importantly, I have also supervised my first Master student, Alessia Marrese, with whom I jointly develop a radical approach to access a new class of aryl C-glycoside analogues, compounds of primary importance in the pharma industry (manuscript in preparation). Having completed her thesis work with great dedication, Alessia recently graduated and succeeded enrolling the PhD course at the University of Padova.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: MARÍN PÉREZ, MARÍA DEL CARMEN
Referencia: RYC2025-056962-I
Correo Electrónico: mdcmarinperez@gmail.com
Título: Evolutionary diversification of light perception: A search for novel rhodopsin families
Resumen de la Memoria:

Dr. Marín Pérez's research is centered on microbial rhodopsin proteins, a diverse family of photoreceptive transmembrane proteins found in various microorganisms. These proteins are crucial for optogenetic tools, enabling the control of neural firing in vivo. The overarching goal is to engineer organisms with innovative features to address global challenges. Dr. Marín Pérez's interdisciplinary approach to studying microbial rhodopsin proteins has evolved from theoretical studies, designing a semi-automatic protocol for constructing quantum mechanics/molecular mechanics (QM/MM) models, to exploring novel rhodopsins through spectroscopy, genomics, and bioinformatics.

She pursued a PhD (defended in 2019, excellent cum laude) at the University of Siena (Italy), focusing on the development of QM/MM models for rhodopsin-type proteins. The Automatic Rhodopsin Modeling (ARM) protocol (JCTC 2016), designed and refined during her PhD, became a pivotal tool for constructing accurate QM/MM models of rhodopsins. ARM aimed to standardize and facilitate studies on rhodopsin proteins, overcoming challenges in experimental structure determination. The protocol reduced user errors and accelerated the production of QM/MM models for photobiological studies. Expanding her research and collaborating with international biophysics groups, Dr. Marín Pérez explored the application of ARM in designing optogenetic tools for in vivo applications (Nat. Commun. 2019, JACS 2018, Faraday Discuss. 2018).

In 2020, she became a JSPS postdoctoral researcher at the ISSP-University of Tokyo (Japan). She delved into the biophysics characterization of microbial rhodopsins. She combined experimental spectroscopic techniques with computational modeling to understand the molecular functions of these proteins. One notable achievement was the functional conversion study on proton-pumping rhodopsins, revealing key residues determining the direction of ion transport (JACS 2023), contributing to understanding the ion-transport mechanisms of microbial rhodopsins. During her second postdoc in 2023, she joined Technion-Israel Institute of Technology (Israel) as an Azrieli researcher, focusing on environmental genomics. She aims to access the genomes of uncultivated microorganisms using various OMICS techniques, identifying protein-coding genes and biochemical pathways of microbial rhodopsins (under review Nat. Microbiol.). This interdisciplinary approach completes her research plan and helps her to consolidate her leadership and independence by starting a new research line (OptGenRod) as principal investigator at the University of Jaén (Spain, November 2024), emphasizing the importance of understanding novel photoreceptive proteins from their discovery and spectroscopic characterization to designing optogenetic tools.

The main goal of Dr. Marín Pérez's future research is to discover novel clades of rhodopsin-type proteins, expanding our understanding of the evolution of light perception on Earth. The guiding hypothesis posits the existence of a previously undiscovered clade of rhodopsins with unique structural and functional characteristics. This novel clade, if found, will provide crucial insights into the evolutionary origins and diversification of this protein family, challenging current paradigms and illuminating the early steps in the evolution of light-sensing mechanisms.

Resumen del Currículum Vitae:

Dr. Marín Pérez is an interdisciplinary researcher specializing in microbial rhodopsin proteins (i.e., photoreceptive membrane proteins present in bacteria, archaea, microeukaryotic organisms (algae, protozoa, and fungi), and giant viruses). Her expertise spans hybrid quantum mechanical/molecular mechanical (QM/MM) methods, biophysics, and bioinformatics.

She earned her BSc in Chemistry with honors in 2014 at the University of Jaén (Spain), and her MSc in Characterization of Chemical Systems in 2015 at the University of Alcalá (Madrid, Spain). Dr. Marín Pérez obtained an international PhD scholarship (2015-2018) at the University of Siena (Italy) with Prof. Olivucci, focusing on solving genomics challenges by developing a semi-automatic protocol (ARM protocol) for constructing QM/MM models for rhodopsin-type proteins. She performed a research stay of 6 months at Bowling Green State University (USA) to enlarge her background in theoretical simulations and predictions. In 2019, she received her PhD (excellent cum laude) and continued as a Researcher Fellow and contributed to her department's recognition with a national research grant Department of Excellence 2018-2022.

She then pursued international postdoctoral fellowships, including one in Japan (JSPS International Postdoctoral Fellowship) where she collaborated with Prof. Keiichi Inoue at the ISSP The University of Tokyo for a research period of 24 months (2020-2022). There, she integrated computational modeling techniques with advanced experimental spectroscopic methods to understand the spectral tuning mechanism of microbial rhodopsin proteins. To expand her research line and understand how some of those new rhodopsins were found, in 2023, she joined Prof. Béjà group at Technion Israel Institute of Technology (Israel) to enhance her research into the bioinformatics and marine ecology fields. She was awarded an international postdoctoral fellowship from the Azrieli Foundation for a research period of 24 months (2023-2025) including a short research stay of 3 months at the ISSP (Japan). Her research involves the spectroscopic characterization of newly discovered rhodopsins.

She has consolidated her leadership and independence by starting a new research line (OptGenRod) as principal investigator at the University of Jaén (Spain). Her impactful research has resulted in 18 peer-reviewed articles (1st/2nd author in 11), wherein one of them she is the co-1st author received the Primo Levi 2019: Honorable Mention Award (Italian Chemical Society), and a book chapter (co-1st author), accumulating 453 citations and an h-index of 11 according to Google Scholar. Her work is focused on disruptive research, as evidenced by 15 top-quality papers in Q1 journals (72%), including Commun. Biol. Nat. Commun., Nat. Microbiol., JACS, JCTC, Electrochim. Acta, JMB, JBC, JCI, and Faraday Discuss. Dr. Marín Pérez's research has been presented at 18 international scientific congresses, including 3 invited lectures and a TEDx Talk.

She co-supervised 2 MSc and 1 BSc theses and oversaw the monitoring of doctoral students. Additionally, she has been a member of organizing committees. She is also committed and currently engaged in public dissemination. She participates in and organizes outreach activities as well as radio interviews, bringing her science with simple and interesting language.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: MARTÍNEZ ALONSO, MARTA
Referencia: RYC2025-055521-I
Correo Electrónico: astromarta09@gmail.com
Título: Harnessing Metal Complexes for Cancer Therapy

Resumen de la Memoria:

My scientific background is centered on the development of new cancer therapies and drugs, mainly through the design of metal complexes. In the early stages of my career, I focused on analogs to cisplatin, using ruthenium and iridium half-sandwich complexes. The goal of these compounds was to destroy cancer cells, primarily through their interaction with nuclear DNA via coordination sites left by their aqua-complexes. However, such chemotherapeutic treatments often suffer from a lack of selectivity, resulting in severe side effects.

In response to this limitation, I have expanded my expertise during my postdoctoral research to explore alternative therapeutic approaches, such as photodynamic therapy (PDT) and photoactivated chemotherapy (PACT), which offer improved selectivity and reduced side effects. In these therapies, biscyclometallated Ir(III) and polypyridyl Ru(II) complexes have been utilized as photosensitizers. Furthermore, the development of cyclometallated Ru(II) complexes has enabled the modulation of the absorption properties, allowing for the use of red light, which presents better tissue penetration for more effective treatment.

Based on this background, I now propose a double-pronged approach, more specialized and with greater scientific and commercial potential. This strategy involves:

(1) The development of novel tetradentate ligands, structurally similar to porphyrins, but based on phenanthrolines. This design would facilitate their conjugation and improve their purification, while retaining their excellent photophysical properties. Additionally, I plan to coordinate first-row metals, which are more affordable and accessible, in order to enhance the feasibility of these compounds.

(2) The design of metal peroxide nanoparticles, encapsulated and decorated with metal-based photosensitizers, specifically targeted at treating hypoxic tumors such as pancreatic cancer.

Both approaches share a common goal: to improve selectivity, thereby reducing side effects and increasing the therapeutic efficacy.

Resumen del Currículum Vitae:

My CVA outlines my scientific career and main achievements. In brief, I have co-authored 23 research publications, mainly in high-impact Q1, including three as a corresponding author and eight as first author, as well as one book chapter and one patent. These publications have resulted in an h-index of 11 and 552 citations, according to Scopus.

I have actively participated in 21 national and international conferences, where I presented my research through oral and poster communications, and was awarded an accessit prize for the best oral presentation. My involvement in research includes seven projects, serving as Principal Investigator in two of them, and securing three competitive postdoctoral grants.

Regarding internationalization, following my predoctoral training in Spain under the supervision of Prof. Gustavo Espino, I completed two postdoctoral positions in the UK and France with leading experts in the field of PDT, Prof. Julia Weinstein and Dr. Gilles Gasser. These positions were supported by prestigious fellowship from Fundación Alfonso Martín Escudero and MSCA grant, for a total of 40 months. Subsequently, I was awarded a María Zambrano grant.

I have peer-reviewed 34 manuscripts for various scientific journals and evaluated 31 MSCA-PF proposals over the past four years (2022-2025) and served on two PhD viva committees.

In terms of dissemination, I have actively engaged in outreach since 2010, participating in initiatives such as Science Week, European Researcher's Night, First Lego League, International Day of Women and Girls in Science (11F). I have also organized Global Women Breakfast (Sheffield, 2019) and Pint of Science (Burgos, 2022-2025).

My teaching experience includes supervising six BSc final work's (TFG) and two MSc final work's (TFM) and currently mentoring two PhD candidates, one MSc and two BSc students.

Additionally, I have served as Guest Editor for Crystals and currently hold the same role in Pharmaceutics.

As a result of my scientific achievements, I have obtained the research accreditation for a six-year period, the Associate Professor (Profesor Contratado Doctor) certification from ANECA and the R3 certificate, recognizing the excellence of my work.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: ZULIANI, ALESSIO
Referencia: RYC2025-056760-I
Correo Electrónico: zuliani.alessio@gmail.com
Título: Smart and Sustainable Nanovectors for Cancer Therapy and Diagnosis

Resumen de la Memoria:

Dr Alessio Zuliani's research is dedicated to creating societal impact through innovative, sustainable science. Combining industrial experience with academic excellence from his Ph.D. and postdoctoral work, he bridges academia and industry, emphasizing applied research and knowledge transfer. His work has led to the development of sustainable materials for cultural heritage preservation and advanced nanovectors for cancer therapy, highlighting his ability to address real-world challenges. The researcher's leadership in EU-funded projects like H2020-APACHE and patents for sustainable biomaterials and VOC-adsorbing systems underscores his innovative contributions. Recognized with awards such as a Ph.D. cum laude, the EU Seal of Excellence, and entrepreneurship prizes, he has demonstrated a commitment to translating research into practical applications. As an believer of open science, he ensures his findings are accessible through open-access repositories. International collaborations with leading institutions in Europe have further enriched his career, enabling the integration of green chemistry and nanotechnology into scalable industrial applications. His diverse experience, including roles as an IT consultant, R&D Manager Assistant, and academic researcher, has equipped him with a versatile skill set to address pressing global challenges. Currently, at the Loyola University, is continuing collaborating with his previous institution IIQ-CSIC in Seville, advancing sustainable drug delivery systems for cancer therapy, merging green chemistry with innovative synthesis techniques. His multidisciplinary approach and focus on sustainability position him as a leader in developing practical, environmentally friendly technologies. The new research line "Smart and Sustainable Nanovectors for Cancer Therapy and Diagnosis" is dedicated to advancing drug delivery systems (DDS) for hematologic cancers. By addressing limitations in current therapies, such as poor selectivity, instability, and inefficiency, this project seeks to develop innovative, sustainable nanovectors tailored for targeted delivery and scalable production. The project focuses on creating smart responsive nanovectors, including micelles, liposomes, and metal-organic frameworks (MOFs), which are designed to selectively target specific receptors in leukaemia treatment. These nanocarriers are engineered to deliver therapeutic agents to both extracellular and intracellular compartments, thereby enhancing therapeutic precision and efficacy. Concurrently, stability and bioavailability of bioactive compounds, such as sulforaphane analogues and NK1 receptor antagonists, will be optimized to bolster their anti-tumoral activity. A critical aspect of the initiative is the integration of continuous flow synthesis, a cutting-edge approach enabling the reproducible production of nanovectors under Good Manufacturing Practice conditions. This technique allows for precise control of synthesis parameters, ensuring scalability and facilitating the transition of these advanced DDS to clinical applications.

Resumen del Currículum Vitae:

Dr Alessio Zuliani has specialized in green chemistry, nanotechnology, and process intensification, with a focus on sustainability and practical applications. He holds a Ph.D. in Fine Chemistry (University of Cordoba, 2019) and has developed expertise in advanced synthesis techniques such as continuous flow, microwave, and ultrasound-assisted methods, as well as organic-inorganic hybrid nanomaterials. His work aims to address global challenges in line with Sustainable Development Goals, emphasizing applied research and industrial translation. Dr Zuliani's scientific output includes 30 publications, 23 of which rank in the top 25% most cited globally, with over 950 citations and an h-index of 19. Professionally, he joined the University of Loyola the 31st of August 2025. Previously, he joined the IIQ-CSIC in Seville (Spain) on June 30, 2022, where he led research focused on hybrid inorganic-organic nanoparticles for drug delivery. From September 1, 2020, to June 30, 2022, he served as a postdoctoral researcher at the CSGI-University of Florence (Italy), directing studies on sustainable materials for preventive conservation and restoration. Between March 1, 2017, and February 28, 2020, he undertook a dual role as a Ph.D. student and postdoctoral researcher at the University of Cordoba (Spain), concentrating on sustainable nanosystems and process intensification technologies. During this time, he conducted research visits to institutions in Italy, Belgium, Austria, and the Czech Republic. Prior to his doctoral studies, Dr Zuliani held the position of R&D Manager Assistant at Menzolit Srl (Italy) from March 15, 2016, to December 31, 2016, where he managed the R&D laboratory. From January 1, 2016, to March 15, 2016, he worked as R&D Brand Manager Assistant at Bolton Srl (Italy). Earlier, from May 1, 2015, to December 31, 2015, he was a research fellow at the University of Milan (Italy), contributing to the development of photoactive materials. Additionally, between 2012 and 2013, he worked as an IT consultant in Italy. Beyond the laboratory, Dr Zuliani is actively involved in dissemination activities, including exhibitions, blogs, social events, social media, and conferences, reflecting his commitment to making scientific advancements accessible and impactful. Mentorship plays a key role in his career, as he has supervised two TFGs and one TFG from the University of Seville, and gave 250 hours of classes. His experience as a father has further enriched his professional skill set by enhancing his emotional intelligence, positive thinking, and problem-solving abilities—qualities he views as integral to both scientific and daily endeavours.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GONZÁLEZ CORTÉS, JOSÉ JOAQUÍN
Referencia: RYC2025-055760-I
Correo Electrónico: joaquin.gonzalez@uca.es
Título: Advanced bioprocesses for waste-gas valorization: from anoxic desulfurization to electro-assisted biomethanation

Resumen de la Memoria:

My research career is defined by the integration of bioprocess engineering and microbial ecology to solve complex challenges in the treatment and valorization of gaseous effluents. My trajectory relies on two consolidated pillars: (i) anoxic biogas desulfurization coupled with nutrient removal, and (ii) the biofiltration of hydrophobic volatile organic compounds (VOCs) and siloxanes using engineered consortia. A third focus is bioleaching of spent catalysts to recover critical metals, using thiosulfate from biogas desulfurization for Cu-ammonia-thiosulfate leaching.

During my PhD and subsequent postdoctoral stages (FPI, LIFE Project), I conceived and validated a novel integrated oxic-anoxic configuration for the simultaneous removal of H₂S from biogas and ammonium from landfill leachates. This work bridged the gap between fundamental science and industrial application, leading to the long-term operation of a pilot-scale bioscrubber in a landfill (LIFE BIOGASNET) and a biotrickling filter in an agricultural setting (Germany), achieving TRL 7.

My international stay at Ghent University (32 months) marked a turning point, allowing me to establish an independent research line on the abatement of siloxanes and hydrophobic VOCs. I demonstrated that conventional biofilters can effectively treat these pollutants through mass-transfer enhancement strategies (surfactant dosing) and inoculum adaptation, challenging the need for expensive physical-chemical polishing. In parallel, I co-lead bioleaching/biohydrometallurgy work-co-supervising a PhD thesis (deposited 11/2025) on removing the -alumina layer of spent three-way catalysts and coupling biogenic thiosulfate with Cu-ammonia-thiosulfate leaching to unlock platinum-group metal recovery-thus connecting gas cleaning with critical-material valorization.

Building on this expertise in reactor design, mass-transfer optimization, and process control, my future research line, "Electro-assisted biomethanation in functionalised hollow-fiber membrane bioreactors (HYMBIO)", proposes a technological paradigm shift for biogas upgrading. HYMBIO aims to overcome the critical limitation of low H₂ solubility in liquid media by developing a hybrid system. This system utilizes functionalized conductive membranes that serve a dual purpose: bubble-free gas delivery (100% efficiency) and acting as a biocathode to stimulate Direct Interspecies Electron Transfer (DIET).

The strategic goal is to convert CO₂ into biomethane (Power-to-Gas), facilitating the storage of renewable energy and decarbonizing the grid. This line aligns with the PEICTI 2024-2027 (Energy & Mobility) and targets the development of a TRL-oriented toolkit for decentralized biomethane production

Resumen del Currículum Vitae:

My research advances bioprocesses for gaseous-effluent treatment through two pillars: (i) anoxic biogas desulfurization coupled to nutrient removal from landfill leachates; and (ii) biofiltration of hydrophobic pollutants (siloxanes/VOCs) through process strategies that improve removal efficiency. During my PhD (FPI) I conceived and validated an integrated oxic-anoxic configuration that simultaneously desulfurized biogas and removed NH₄⁺ from leachates, enabling stable operation and elemental sulfur valorisation. These results supported technology maturation and field deployment: as scientific co-lead, I helped operate and troubleshoot a landfill integrated pilot (SBR + bioscrubber) within LIFE (>60 consecutive weeks, TRL-7) and co-led a farm-scale BTF in Germany, demonstrating robustness under real gas compositions. We established internal operating guidelines (ORP/pH/T envelopes, start-up and troubleshooting routines) used by the pilot team; materials are prepared for transfer and have informed NDA discussions with utilities (2024-2025).

In parallel, I established an independent line on siloxane biofiltration, showing that conventional biofilters can remove key siloxanes by tuning gas-liquid transfer (surfactants/EBRT) and inoculum selection while maintaining community stability. As corresponding author in 2025 (DOI: 10.1016/j.biortech.2025.132439), I led the first integration of feedback control with multi-omics in anoxic BTFs to diagnose high-load failure modes and define actionable control windows. I prioritise reusable outputs-datasets, scripts and SOP-like internal guidelines-released where applicable via public repositories (Mendeley, NCBI, PRIDE) and publish Open Access via CRUE agreements.

I demonstrate independence and leadership as PI of PR2023-004 (anoxic bioremoval of volatile sulfur compounds) and FEDER-UCA-2024-A1-13 (microplastics mitigation in WWTPs by integrating advanced oxidation with activated sludge and targeted bioaugmentation). I co-supervise two PhD theses (one deposited 11/2025) and supervise BSc/MSc projects (12 defended, 8 ongoing); I have delivered >350 h of teaching (incl. MSc in English) and participate in three teaching-innovation projects.

My internationalisation includes 29 months postdoctoral at UGent plus a 3-month Erasmus+ predoctoral stay, consolidating a two-way UCA-UGent pipeline (process-engineering and control-aware operation → UGent; TD-GC-MS workflows and biofilter engineering → UCA). I maintain collaborations with RWTH Aachen (pilot agricultural applications of anoxic biodesulfurization), UNAM (methane oxidation/consortia dynamics) and partners in Italy/Japan.

Recognitions include the Extraordinary PhD Prize (UCA) and two departmental awards for impact. I completed the PhD in 3.5 years (Cum Laude, International Mention) and bring 14 months of industry experience (fermentation, process optimisation). Outreach includes the European Researchers' Night and related events.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: VASSILEV GALINDO, VALENTÍN
Referencia: RYC2025-056831-I
Correo Electrónico: vvassilevgalindo@gmail.com
Título: Computational Chemistry meets Artificial Intelligence to advance fundamental science within international collaborations

Resumen de la Memoria:

I am co-author of 16 publications (5 as first author; 2 as corresponding author, 8 without PhD supervisor), in internationally respected journals such as Nature Communications, Science Advances, Nature Reviews Chemistry, and Chemical Reviews. To date, these publications have a total citation number over 1660 and h-index = 11, clearly highlighting their high-impact and relevance to the field. Additionally, I have 2 publications that are currently under peer-review. I have had the opportunity to study and do research in four countries and have therefore been able to develop a large international collaborative network. I have developed meaningful scientific collaborative relationships with several researchers, demonstrating my independence and leadership. I am committed to the dissemination of my research results, which has resulted in my participation in 20 conferences worldwide as presenting author (10 posters and 7 oral contributions) and 3 talks as keynote speaker. Also, I have served as keynote speaker in 2 events for science communication. Moreover, I am currently organizing two international conferences.

I have developed both technical and soft transferable skills (communication, research and time management, problem-solving, leadership) thanks to my extensive international experience in different countries and working environments. Such experiences have allowed me to work in world-leading research groups in Mexico, Luxembourg, and Spain.

I have supervised a Master's thesis and helped in the supervision of 4 PhD students and a Master student. Currently, I am an independent researcher at UPNA, developing my own research line. I am supervising a PhD student, and, next year, I will supervise both a Bachelor and a Master student.

My research lines are all based on the use of Computational Chemistry, Artificial Intelligence (AI), and the combination of both. In general, I can summarize my research interests in the following lines: modelling of potential-energy surfaces, analysis of electronic properties of molecules and materials, computer-aided search and design of new molecules and materials, and discovering and understanding of causal relationships in chemical and physical processes. Among my different lines, I would like to focus during the grant in the line devoted to computer-aided search and design of new molecules and materials. For instance, the project Generative Models for the Inverse Design of Heterogeneous Catalysts (GeMoCat), has as main goal the development novel AI strategies trained on first principles calculations capable of designing new heterogeneous catalysts with an activity comparable (or even better) to currently used catalysts but possessing the needed attributes for enabling more sustainable chemical processes. The completion of this project would be a paradigm shift for achieving the target of sustainable economy and environment by providing a set of catalysts candidates that can make industrial processes more efficient. This project is translated into 3 measurable objectives to achieve the main goal. Each objective will represent a step beyond the state-of-the-art, for heterogeneous catalysis in particular, but also for Computational Chemistry, AI, and molecular and materials design, in general.

Resumen del Currículum Vitae:

I have a broad experience in the study of chemical and physical phenomena and processes with proven multidisciplinary experience in Chemical Engineering, Theoretical & Computational Chemistry, and Artificial Intelligence (AI) with deep expertise in atomistic modelling and machine learning (ML). To date, I have carried out my research in multicultural environments in 4 different countries. I graduated with honours from Universidad Veracruzana (Mexico) with a Bachelor's degree (2014) in Chemical Engineering. Later, I was granted a National scholarship from CONACYT (Mexico) for Master funding and graduated from CINVESTAV Unidad Mérida (Mexico) with a Master's degree (2017) in Physical Chemistry. In 2018, I joined the group of Prof. Alexandre Tkatchenko in the University of Luxembourg as doctoral researcher after being granted a PhD position in the Doctoral Training Unit "MASSENA" funded by the Luxembourg National Research Fund (FNR). I obtained my Doctorate degree (PhD viva date: 03/03/2022) in Physics from the University of Luxembourg. After earning my PhD, I worked as a Postdoctoral Researcher in the same group helping in the supervision of 1 graduate and 3 PhD students, hence demonstrating my supervising and leadership skills, and collaborated in projects within the European Research Council Consolidator Grant BeStMo (Grant no. 725291) and the FNR grant C19/MS/13718694/QML-FLEX. In January 2023, I joined IMDEA Materials Institute (Spain) as a Postdoctoral Research Associate in the Bio/Chemo/Mechanics of Materials group of Prof. Javier Llorca, in the MAD2D project to use both ML and computational chemistry for understanding structure-property relationships in materials characterization and catalysts. In April 2023, I was awarded a Marie Skłodowska-Curie Actions (MSCA) Postdoctoral Fellowship through my project HighHydrogenML (Grant no. 101105610). As a Principal Investigator (PI) of this project, I led the research plan. Being the MSCA Postdoctoral Fellowships one of the excellent science programmes of the European Union, it highlights my high competences in funding acquisition, leadership, and research management. After finishing my MSCA project, I joined the Universidad Pública de Navarra (UPNA) and the Navarra Artificial Intelligence Research Center (NAIR). There, I am developing my research line on AI applied to Computational Chemistry as an independent researcher.

I am co-author of 16 publications (5 as first-author, 2 as corresponding author, 8 without my PhD supervisor), in internationally respected journals. I am 4 years post PhD defense. To date, these publications have over 1660 citations (h-index 11), clearly highlighting their high-impact and relevance to the field. I have participated in 20 international conferences (10 posters, 7 contributed and 3 invited talks). I have worked in 5 different research projects, including my MSCA project, where I was PI. I have supervised a Master's thesis and helped in the supervision of 4 PhD students and a Master student. Currently, I am supervising a PhD student, and, next year, I will supervise both a Bachelor and a Master student. Moreover, I have served as review editor of more than 45 articles in peer-reviewed journals, as reviewer commissioned by the National Science Centre in Poland, and as reviewer of abstracts for the 18th ICC conference.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: ROJAS BUZO, SERGIO
Referencia: RYC2025-056866-I
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Título: Understanding the behavior of porous materials for heterogeneous catalysis
Resumen de la Memoria:

My research career began during my BSc and MSc studies at the University of Extremadura, where I was trained in organic and prebiotic chemistry and investigated the structural and mechanistic aspects of mesoionic compound synthesis. Supported by a competitive national fellowship, this work resulted in a publication in The Journal of Organic Chemistry. These early experiences consolidated my vocation for scientific research and provided a strong foundation in reaction mechanisms, experimental design, and collaborative work.

I subsequently pursued my PhD at the Institute of Chemical Technology (ITQ, Valencia), an internationally recognized center of excellence in catalysis, funded by a Generalitat Valenciana fellowship. Under the supervision of Prof. Avelino Corma and Dr. Pilar García, my doctoral research focused on the synthesis, ex situ characterization and catalytic application of metal-organic frameworks (MOFs), particularly Lewis-acid MOFs based on tetravalent metals for biomass valorization. I completed my PhD with Cum Laude and International Mention, publishing four Q1 articles as first author, reflecting early scientific independence.

During my PhD, I carried out a short research stay at MIT, where I expanded my work toward large-scale synthesis and catalytic implementation, resulting in a high-impact publication and strengthening my international profile and scientific communication skills.

My first postdoctoral stage at ITQ with Dr. Manuel Moliner focused on Ce-based MOFs for redox catalysis and marked a consolidation of my autonomy as a researcher. This period resulted in nine publications within two years, supported by collaborations with interdisciplinary teams.

Driven by my interest in understanding catalyst behavior under real reaction conditions, I moved to the University of Turin with Prof. Silvia Bordiga, supported by a Margarita Salas fellowship. There, I specialized in in situ and operando spectroscopic techniques (XAS, IR, Raman, UV-Vis) to follow the evolution of active sites during catalysis. This stage represented a major step in my scientific maturation, leading to 11 publications, several as corresponding author, extensive collaboration with synchrotron facilities (ESRF and Elettra), significant teaching activity, and supervision of MSc and PhD students.

I am currently a postdoctoral researcher at the Institute of Chemical Research (IIQ, CSIC-University of Seville), working on metal nanoparticles for magnetically induced catalysis, co-supervising a PhD student and with a manuscript submitted to Green Chemistry. Supported by a competitive Junta de Andalucía project, I am transitioning to Dr. Jesús Campos's group to acquire advanced expertise in organometallic chemistry, aiming to integrate molecular complexes into MOFs for the development of innovative catalysts for small-molecule activation, particularly CO₂.

Overall, my career follows a coherent progression from mechanistic organic chemistry to heterogeneous catalysis, operando characterization, and molecular materials, positioning me well to develop independent, multidisciplinary and high-impact research in sustainable catalysis.

Resumen del Currículum Vitae:

My scientific career began in Organic Chemistry during my BSc at the University of Extremadura (National Research Fellowship, 2013), where I published my first article on the mechanistic study of mesoionic compound synthesis. During my MSc at the same institution (Master Award, 2014), I transitioned to Prebiotic Chemistry, which consolidated my vocation for research and motivated me to pursue an academic career.

I completed my PhD at the Institute of Chemical Technology (ITQ) under the supervision of Prof. Avelino Corma, focusing on the synthesis of Metal-Organic Frameworks (MOFs) and their application in catalysis (Generalitat Valenciana Fellowship). I obtained the Cum Laude and International PhD distinctions, including a research stay at MIT with Prof. Yuriy Román Leshkov, which resulted in an article published shortly after my arrival. By the end of my PhD, I had published four Q1 articles as first author, with a high degree of scientific independence and limited co-authorship.

My first postdoctoral stage at ITQ, working with Dr. Manuel Moliner, focused on Ce-based MOFs for redox catalysis. This period consolidated my autonomy as a researcher, leading to nine publications in two years and collaboration with multidisciplinary teams.

I then undertook an international postdoctoral stay at the University of Turin with Prof. Silvia Bordiga (Margarita Salas Fellowship, 2021-2023), specializing in advanced in situ/operando spectroscopic techniques (XAS, IR, Raman, UV-Vis) to elucidate the evolution of active sites in porous catalysts under working conditions. During this stage, I published eight papers as corresponding author, supervised six MSc students, co-supervised a PhD thesis, and established a strong international collaboration network, including major synchrotron facilities (ESRF, Elettra).

Currently, I am a postdoctoral researcher at the Instituto de Investigaciones Químicas (IIQ-CSIC) in the group of Dr. Luis Miguel Martínez Prieto, working on metal nanoparticles for magnetically induced catalysis, where I co-supervise a PhD student and recently submitted a manuscript to Green Chemistry. Supported by a competitive project from the Junta de Andalucía, I am transitioning to the group of Dr. Jesús Campos to acquire advanced training in organometallic synthesis, further strengthening my profile toward independent and multidisciplinary research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Overall, I have participated in seven competitive national and international projects, acting as Principal Investigator in two and collaborating with industry in one. My publication record comprises 25 peer-reviewed articles (Nature Communications, Nature Catalysis, Chemical Reviews, ACS Catalysis, etc.), with 13 as first author and 7 as corresponding author independent of my PhD supervisor, accumulating ~1,329 citations (h-index 16). I have delivered 16 oral presentations, been an invited speaker at international schools, serve regularly as a referee, and have extensive teaching, supervision, and outreach experience.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GARCÍA DEL RÍO, PABLO
Referencia: RYC2025-056996-I
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Título: Green biorefinery processes for the production of renewable polymers and bio-based materials
Resumen de la Memoria:

Since the beginning of his scientific career, Pablo García del Río has focused on developing eco-friendly, multiproduct biorefineries for lignocellulosic and macroalgal biomass. His PhD work combined autohydrolysis and microwave-assisted processes to obtain hemicellulosic oligomers, lignin and cellulose, enabling the production of bioethanol and high-value bioproducts. This work resulted in 9 publications (7 research, 2 reviews), competitive PhD contracts (U. Vigo, Xunta de Galicia, FPU/MECD), and 2 international stays at U. Minho and U. British Columbia, generating 6 additional publications and consolidating international collaborations.

During his postdoctoral stage, he established his own research line on the use of deep eutectic solvents (DES) for sustainable biomass fractionation, already leading to 5 publications (4 research and 1 review) as corresponding or last author, demonstrating growing independence and leadership. His two one-year postdoctoral stays at U. Limerick and U. Aveiro enabled him to acquire advanced expertise in polymer extraction, polymer chemistry and biomaterials synthesis, particularly hydrogels and bioactive films. These stays also allowed him to transfer knowledge back to his home institution, initiating the group's first works on biomaterials and supervising a PhD student within this emerging line.

Building on this trajectory, his RyC research plan integrates two synergistic lines: (i) environmentally friendly processes for polymer extraction and production, including the development of DES fractionation to simultaneously obtain lignin, cellulose and hemicelluloses, and the transformation of hemicellulosic pentoses into furfural and polymeric derivatives (furfuryl alcohol, polyfurfuryl alcohol), and (ii) synthesis and evaluation of polymer-based hydrogels for environmental applications, including fire-retardant hydrogels and hydrogels for controlled nutrient release. These materials build upon the expertise acquired in Limerick and Aveiro and the candidate's ongoing collaborations on nanocellulose production and green polymer chemistry.

Overall, his scientific trajectory is characterized by strong international mobility (34 months), sustained publication in Q1/D1 journals, active leadership (PI of projects, WP leader, supervision of PhD/BSc/MSc students), and the ability to establish new research lines independently from his PhD supervisors. The RyC fellowship would consolidate a competitive research program at the interface of green engineering, polymer science and sustainable materials, with high potential for knowledge transfer, international collaboration and societal impact.

Resumen del Currículum Vitae:

Pablo García del Río completed his BSc in Environmental Sciences in 2015 (Beca de colaboración-MECD) and Dra. Julia Franco Award for Best BSc Thesis) and a MSc in Agri-Food and Environmental Science and Technology in 2016. He obtained his PhD in the Chemical Engineering Department at U. Vigo in 2022 with the highest grade cum laude and the PhD Extraordinary Award, supported by competitive fellowships from U. Vigo, Xunta de Galicia and the Spanish MECD (FPU). He carried out 2 international PhD stays at U. Minho (4 months) and U. British Columbia (6 months), leading to 5 high-impact publications and the Iacobus Scientific Publication Award.

In 2022 he was awarded a competitive junior postdoctoral contract (Xunta de Galicia), during which he performed two one-year international stays at U. Limerick (Ireland) and U. Aveiro (Portugal), expanding his expertise to polymer extraction, DES-based fractionation and biomaterials synthesis. In 2025 he obtained a senior postdoctoral position and PI funding from Xunta de Galicia to develop polymer-based biomaterials from vine pruning residues. Altogether, he has accumulated 34 months of international research experience.

He is author of 37 peer-reviewed publications (JCR), of which 33 are top 25% (Q1) and 19 are top 10% (D1), with 12 first-author, 12 corresponding-author and 4 last-author papers. Approximately 70% of his publications position him as first, corresponding or last author, and 10 articles were published independently from his PhD supervisors, demonstrating scientific maturity and the capacity to drive research lines autonomously. He has an h-index of 19, more than 850 citations in Scopus, and more than 1000 citations in Google Scholar. He is co-author of 8 book chapters, more than 80 conference contributions (14 oral, and 2 best poster awards) and 1 dissemination article.

He has participated in 15 competitive projects (more than 5 million euros), including 4 EU-funded, 1 international non-EU (Uruguay), 5 national, 4 autonomic and 1 local. He is PI of two autonomic projects and Work Package Leader in projects from Uruguay, INTERREG-POCTEP, INTERREG-SUDOE and national calls, demonstrating significant leadership and independence.

He supervises 3 PhD theses (one defended in 2025 with sobresaliente cum laude and 4 associated publications, and 2 with expecting dissertations in 2027), as well as 17 BSc and 2 MSc theses, most of them independently from his PhD supervisors. He has mentored international PhD and postdoctoral researchers from Uruguay, Brazil and Portugal. He has reviewed more than 120 manuscripts for scientific journals since 2020.

His teaching experience includes 310 h in BSc and MSc programs across the Vigo and Ourense campuses, the coordination of 4 university extension courses (85 h) and active roles in institutional management: coordinator of the 3rd-year curriculum, coordinator of the Training Activities of the PhD Program (since 2024), tutor of the Tutorial Action Plan, and coordinator of the "Nutrition and Health" cluster in the European project ATHENA.

He holds ANECA accreditations for Ayudante Doctor, Contratado Doctor and Profesor de Universidad Privada, and has completed more than 160 h of specialized research and pedagogical training, holding an Advanced C1 English certificate (Cambridge).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: ARTIGAS RUF, ALBERT
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Correo Electrónico: albert.artigas@udg.edu
Título: Synthesis and functionalization of functional nanocarbons

Resumen de la Memoria:

Dr. Albert Artigas Ruf (1990) is a postdoctoral researcher specialized in theoretical and experimental studies focused on the design and synthesis of singlet fission materials based on antiaromatic polycyclic conjugated hydrocarbons and fullerenes for photovoltaic applications. He conducts research in the DiMoCat group (IQCC, University of Girona, Spain) with a Beatriu de Pinós contract (BP 2023). Before that, he worked in the same group with an MSCA postdoctoral contract (HORIZON-MSCA-2022-PF-01, Apr 2024–Mar 2025) and a Margarita Salas contract (REQ 2021, Apr 2023–Mar 2024). Previously, he worked at the ISM2 (Marseille) under CNRS and Margarita Salas contracts. He worked in the synthesis and functionalization of chiral multi-helicenes, combining experimental research with theoretical studies on the (anti)aromaticity of contorted polycyclic aromatic hydrocarbons.

Dr. Artigas earned his Ph.D. in Chemistry in 2020 (IQCC, University of Girona, Spain) with the highest distinction (Excellent Cum Laude), under the supervision of Prof. Anna Roglans, Prof. Miquel Solà, and Dr. Agustí Lledó. His doctoral research, funded by an FPI predoctoral contract (2015 call), focused on transition metal-catalyzed cycloaddition reactions. During his thesis, he completed a research stay at the University of Texas at El Paso under the supervision of Prof. Luíś Echegoyen.

Dr. Artigas completed a master's degree in Organic Chemistry at the University of Barcelona (UB) in 2015. During that period, he carried out a research internship at the Pharmaceutical Chemistry Unit of the Faculty of Pharmacy of the same university under the supervision of Prof. Diego Muñoz-Torrero. Before that, he obtained a 5-year degree in Pharmacy at the Faculty of Pharmacy of the UB in 2014. He carried out two research internships: (1) at the Pharmaceutical Chemistry Unit of the Faculty of Pharmacy (UB) under the supervision of Prof. Diego Muñoz-Torrero, and (2) at the Royal College of Surgeons in Ireland (Dublin) under the supervision of Prof. Mauro Adamo.

As a Ramón y Cajal Fellow, the candidate aims to combine the potentialities of singlet fission (SF) and single-material organic solar cells (SMOSCs) to fabricate efficient photovoltaic devices that incorporate fullerenes functionalized with SF moieties as the active layer. The project is conceived as an integrated approach that will combine computationally assisted materials design and chemical organic synthesis. In the first stage, a combination of machine learning and quantum chemical calculations will be used to identify potential SF chromophores. In the second stage, their synthesis will be attempted. Successfully prepared compounds will be characterised with time-resolved spectroscopic techniques and, once their ability to experience SF has been proved, they will be attached to fullerenes via Bingel reactions to form molecular donor-acceptor dyads and triads. Finally, these fullerene derivatives will be tested in laboratory-scale photovoltaic devices.

Resumen del Currículum Vitae:

Along his career, Dr. Artigas has co-authored 29 research articles (5 as corresponding author, 14 as first or co-first author), 2 book chapters, and 3 additional research articles that are currently under revision. His work has been cited 257 times (h-index = 11, Scopus), with 5 papers featured as research highlights or included in themed collections. 3 more articles have been showcased on journal covers. He has presented his research in the form of 11 oral communications and 7 posters in 5 national and 11 international conferences. Dr. Artigas has a high degree of internationalization, with 39 months of research stays across 3 countries and ongoing collaborations with 9 research groups. His work is supported by active involvement as a researcher in 11 projects since the beginning of his graduate studies.

Dr. Artigas is engaged in teaching activities and in the training of young researchers. He co-supervises 2 PhD students: Ms. Iqra Sarfraz (IF-UdG grant, co-supervised by Prof. Miquel Solà) and Mr. Adrià Montal (FPU grant, co-supervised with Dr. Anna Pla). Additionally, he independently supervises 1 final degree thesis (Mr. Andreu Montilla) and teaches Organic Chemistry (6 ECTS/year) to third-year Chemistry students. In the past two years, he has independently supervised 1 final degree thesis and 1 MSc thesis (Mr. Adrià Montal, Spanish Government Collaboration Grants). Earlier, during his doctoral studies and postdoctoral stays, he also participated in the day-to-day training of 6 B.Sc. students. Demonstrating his growing scientific independence, in 2025 he obtained accreditation as an Associate Professor (Professor Agregat) from the Catalan University Quality Assurance Agency (AQU Catalunya).

Dr. Artigas is actively involved in academic and public science outreach. Over the past two years, he has participated in several dissemination activities, including 1 public talk and 2 workshops during the European Researchers Night (Sept 2024 and Sept 2025), 1 outreach talk on carbon nanostructures for fourth-year Chemistry students (Sept 2024), and 2 workshops aimed at high school students during the UdG Open Doors Day (Feb 2024). He also represented the DiMoCat group in the annual Science Slam event (Oct 2025). As a PhD student, he was awarded second prize in the "Your Thesis in 4 Minutes" science communication competition (May 2018). He is a member of the organizing committee of the Girona Seminar (Apr 2026), where he is responsible for coordinating the Young Researchers Symposium (YRS). In the 2024 edition, he also contributed to the organization of the YRS. Additionally, he has evaluated 6 MSc and two BSc theses, and serves as a reviewer Nature Communications, ACS Catalysis, Chemical Physics, ChemPhysChem, Physics Letters, European Journal of Organic Chemistry, Synthesis, Molecules, and Materials. He has also acted as an expert reviewer for the 2025 AAPG call of the French Research Agency (ANR).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: TAFARO , ALESSANDRA
Referencia: RYC2025-055436-I
Correo Electrónico: a.tafaro@bsrome.it
Título: Street Literature: Politics and Poetics of Anonymity in the Graffiti Culture of Roman Campania
Resumen de la Memoria:

Situated at the intersection of Latin literature and Roman epigraphy, the proposed Ramón y Cajal research project, *Street Literature: Politics and Poetics of Anonymity in the Graffiti Culture of Roman Campania* (StreetLit), builds upon my current British Academy Postdoctoral Fellowship and establishes the foundation for an ERC Starting Grant application planned for Summer 2026. I possess substantial experience in applying for highly competitive research grants, as well as expertise in Latin literature and Roman epigraphy, which together position me to carry out this project successfully. While my present research concentrates on epigraphic poetry from Rome and Pompeii and its interrelationship with Latin literature *latu sensu*, the proposed project will broaden this focus to encompass the epigraphic culture of Roman Campania, including Greek and Latin inscriptions and graffiti composed in verse and prose, and will develop a new, original digital research dimension.

Street Literature: Politics and Poetics of Anonymity in the Graffiti Culture of Roman Campania (StreetLit) pioneers the first systematic and interdisciplinary analysis of Graeco-Latin verbal parietal graffiti from Pompeii, Herculaneum, and Stabiae (I century BC to II century AD). By combining textual and philological analysis, on-site examination, and geo-spatial mapping, the project assesses for the first time the role of anonymity in Roman epigraphic and literary culture.

Texts without authors have long been victim to neglect or aesthetic prejudice and are underrepresented in the literary canon. A recent rehabilitation of anonymous literature in Graeco-Latin literary scholarship has disrupted key traditional assumptions about aesthetic worth, authorship, and authenticity. Yet, despite its field-defining contribution, the corpus of anonymous graffiti, which survives as intentionally anonymous, remains neglected. This project will shift traditional perspectives on Graeco-Roman literature as an exclusively highbrow activity, by offering a pioneering analysis of the political, literary, and cultural function of anonymity in the graffiti of Roman Campania. Through the interpretive frame of anonymity, the proposed project will redefine our understanding of political discourses, negotiation of identity politics, aspects of gender relations, practices of citation, and modes of authorship. It takes the anonymity of graffiti as the privileged site from which to question the validity of scholarly categories such as *popular* and *elite*, *literary* and *sub-literary* that dominate critical interpretations of Graeco-Roman literary and epigraphic cultures.

StreetLit will produce a Linked Open Data (LOD) digital resource that integrates machine-readable data from key existing platforms, including Musisque Deoque (MqDq), the Epigraphic Database Roma (EDR), and The Ancient Graffiti Project (AGP). Through GIS-based mapping and on-site analysis, this tool will enable new insights into the distribution and function of anonymous graffiti in the urban fabric of Roman Campania.

Resumen del Currículum Vitae:

I am currently a British Academy Postdoctoral Fellow at the British School at Rome, where I am serving as PI of a research project on Roman epigraphic poetry (funding: £196.000). During this prestigious fellowship (success rate c. 12%), I have significantly enhanced my publication profile.

My first monograph, *Inscribing Flavian Rome: Epigraphic Strategies in Martial's Epigrams*, published by Oxford University Press in 2025 (ISBN: 9780198962519), breaks new ground in the field of Roman epigram, establishing a new interpretation of early-imperial writing culture that reconsiders literary and epigraphic modes of communication as inter-permeable. This volume argues for conceptualising epigrammatic poetry and epigraphic writing as complementary cultural activities that involve not only generic interactions, but also intersecting audiences and interconnected socio-cultural phenomena, such as *damnatio memoriae* and Saturnalian carnival.

Sitting at the juncture between Roman epigraphy and Latin literature, my research outputs testify to my reputation in the work of shifting the baselines of the study of epigraphic culture. I have published several articles and book chapters in peer-reviewed top tier journals, including *The Papers of the British School at Rome* (CUP) and, since 2024, I have collaborated with the Director of the digital corpus *The Ancient Graffiti Project*, Professor Rebecca Benefiel, where I curated numerous critical editions of poetic graffiti from Pompeii. My second monograph, *Inscribing Anonymity: Un-Authorred Poetry in Roman Epigraphic Culture*, is currently under consideration at Oxford University Press. I am also preparing an edited volume based on the international conference organised at the British School at Rome for Routledge.

My strong record in organising fully-funded conferences demonstrates my ability to implement dissemination activities and my proactive engagement in scholarly life. In 2024 I co-organised the conference panel *Power Play and Literary Games: Ludus in Latin Literature* at the Classical Association Conference (University of Warwick), and in 2022 I co-organised an interdisciplinary and international conference on authorship and anonymity (University of Warwick). I have presented my research in more than 35 scientific conferences across Europe and the US, ensuring broad dissemination of my work.

My research places me in an international academic network. In 2024 I was visiting fellow at the University of Cambridge and in 2019 I was visiting researcher at Princeton University and the University of Pennsylvania. In 2022, I was recipient of a prestigious Rome Award at the British School at Rome, where she conducted research on the gladiatorial graffiti of Rome. My participation in the competitive *Advanced Seminar in the Humanities* at the Venice International University (2023) further testifies to the recognition of my outstanding potential as an academic and ability to develop international scholarly networks.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: LÓPEZ PRAT, MÓNICA
Referencia: RYC2025-054393-I
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Título: Decoding the alchemy of Monumental Terracruda Sculpture: Material Science, Conservation and Traditional Knowledge along the Silk Roads

Resumen de la Memoria:

Mi trayectoria investigadora se origina en la falta de protocolos diagnósticos y estrategias de conservación para la escultura monumental en terracruda (MTS), una de las tradiciones más extendidas pero menos comprendidas del patrimonio budista. Ante ejemplos arqueológicos frágiles de Uzbekistán y Afganistán, comprendí que conservar estas obras exigía primero entender la tecnología, la lógica material y los sistemas de conocimiento que sostienen estas esculturas no cocidas.

Para abordar esta laguna, adopté un enfoque multidisciplinar que combina ciencia del patrimonio, etnografía y estudios de textos sánscritos antiguos. La investigación arqueométrica de los ejemplos afganos, mediante una estrategia multidagnóstica, reveló conexiones directas con el trabajo de campo etnográfico que documenta Conocimientos Tradicionales (TK) en India, el Himalaya y China. Estas prácticas vivas muestran que principios como la selección de arcillas, la adición de fibras y la gestión del secado se mantienen a lo largo del tiempo y de las regiones. La integración de estos datos demostró que la producción de MTS seguía un proceso complejo y deliberado, lejos de los métodos simples que se habían asumido en la bibliografía. Los análisis también identificaron mezclas de biopolímeros añadidos intencionalmente, en consonancia con prescripciones de textos sánscritos; gámicos, lo que confirma un conocimiento empírico altamente desarrollado.

La convergencia entre evidencias arqueológicas, textuales y etnográficas reveló un sistema tecnológico sofisticado que había pasado desapercibido. Esta comprensión está redefiniendo la MTS como una tradición material sustentada en saberes acumulados y en decisiones culturales bien fundamentadas.

A partir de estos resultados, he liderado el desarrollo del primer protocolo diagnóstico específico para la MTS, que permite comparar de forma sistemática las pastas de modelado, las variaciones regionales y los indicadores de conservación, constituyendo una base científica para estrategias futuras.

Mi trabajo actual sitúa la MTS dentro de las redes culturales de la Ruta de la Seda, mostrando cómo recetas, materias primas y conocimientos técnicos circularon entre regiones. Esta perspectiva conecta el estudio tecnológico de la MTS con debates sobre transmisión de saberes, interacción cultural y sostenibilidad material.

En conjunto, mi trayectoria demuestra que comprender la MTS implica descifrar la "alquimia de la arcilla" presente en los restos arqueológicos, las prácticas tradicionales y las fuentes textuales. Este enfoque integrador no solo llena una laguna científica, sino que también reconoce la MTS como una de las formas más avanzadas del patrimonio en tierra. Al reconstruir los principios materiales y técnicos que guiaron su producción, esta investigación ofrece una base transferible para desarrollar métodos de conservación sostenibles, basados en la evidencia y aplicables tanto a la MTS como a otras tradiciones de patrimonio en tierra.

Resumen del Currículum Vitae:

Mi CVA refleja una trayectoria investigadora internacional e interdisciplinar dedicada a comprender la tecnología, la cultura material y los sistemas de conocimiento que sustentan la escultura monumental en terracruda (MTS). Motivada por la ausencia de protocolos de conservación para esta tradición frágil y poco estudiada, he integrado arqueometría, ciencia del patrimonio, etnografía y análisis textual para reconstruir los marcos tecnológicos que respaldaron su producción en el mundo antiguo budista.

He desarrollado una amplia experiencia mediante colaboraciones con el Instituto Arqueológico de Afganistán, la Universidad de Calcuta, Tamil University, el Shanghai Institute for Conservation of Cultural Heritage, el Instituto Arqueológico de Samarcanda y varios laboratorios punteros de Europa. Mis postdoctorados JdC y MSCA me proporcionaron formación avanzada en análisis científico y han consolidado mi presencia en redes europeas. El trabajo de campo en Afganistán, Uzbekistán, India, Bután y China me permitió documentar ejemplos arqueológicos y Conocimientos Tradicionales (TK) en sus contextos culturales.

Mis publicaciones, todas como primera autora, han contribuido a replantear la MTS como una tradición tecnológicamente sofisticada. El trabajo multianalítico ha permitido vincular prácticas antiguas con TK vivo e identificar biopolímeros añadidos intencionalmente en esculturas afganas, resultados no documentados previamente. Estos hallazgos revelan sistemas deliberados de modificación de arcillas coherentes con formulaciones sánscritas y con el TK observado en campo, abriendo nuevos debates sobre tecnologías antiguas, transmisión de conocimientos y conexiones de la Ruta de la Seda.

Uno de los principales resultados de mi trayectoria es el primer protocolo diagnóstico específicamente diseñado para la MTS. Presentado en Technart 2025 y actualmente en revisión en JCH, permite comparar de forma sistemática pastas de modelado, elecciones tecnológicas regionales e indicadores de conservación.

Además, he contribuido a la formación y a la transferencia de conocimiento mediante la dirección de tesis, la docencia interdisciplinar y la creación de colaboraciones que conectan perspectivas científicas, artesanales y comunitarias. La documentación del TK y su relación con la tecnología antigua ha fortalecido redes internacionales y apoyado la creación de capacidades en ciencia del patrimonio.

También participo activamente en la difusión científica, impartiendo conferencias invitadas sobre arte budista, arqueología de Asia Central y conservación, y colaborando en iniciativas de acceso abierto. Mi práctica sigue los principios de la Ciencia Abierta, garantizando métodos transparentes, datos accesibles y el desarrollo colaborativo de herramientas como el protocolo MTS.

En conjunto, mi CV evidencia una trayectoria coherente e innovadora centrada en descifrar la "alquimia de la arcilla" de la MTS y en sentar las bases de métodos de conservación sostenibles y basados en la evidencia, con potencial para impulsar un nuevo ámbito de especialización en conservación-restauración en la academia española.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
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Correo Electrónico: a.pastor.restaura@gmail.com
Título: Conservación de Patrimonio Arqueológico Crítico e Interdisciplinar

Resumen de la Memoria:

The interdisciplinary nature of Dr. Ana Pastor Pérez's career and her dedication to connecting academia with social issues led her to work at the prestigious Getty Conservation Institute (Los Angeles, US), participating in several actions on R&D and a capacity strengthening project in Perú. Dr. Pastor's unique approach to archaeological conservation includes cross-disciplines such as public archaeology, participatory action research, critical heritage studies, museology, and community-driven strategies for cultural heritage management. Dr. Pastor's work has been mainly developed at the Universities of Barcelona and Madrid; however, she has also been trained on an international level in France, Italy, Norway, Portugal, the UK and US. Her PhD, (2019, University of Barcelona) opened a new groundbreaking line of research in participatory conservation of cultural heritage and heritage values. In 2016, and as a result of its participation in the international project Heritage@Values (EU-JPI 2013-2015), she edited the volume "Arqueología y Comunidad. El valor social del patrimonio arqueológico en el siglo XXI". This was a significant milestone in the field of community archaeology and in theoretical studies linking it to heritage management, and it was the beginning of the group of researchers in public archaeology and cultural heritage at the University of Barcelona, GAPP, that she co-founded in 2015 attracting several international researchers and networks. In 2020, she edited a new compendium of works on cultural heritage, this time in the form of essays and for the general public, "21 Assajos al Voltant del Patrimoni Cultural" (JAS Arqueologia 2020). During the first few years after earning his PhD, Dr. Pastor becomes interested in new topics that allow for the exploration of new ways to manage cultural heritage, such as digital ethnographies, impact indicators, and sustainability. These topics have been dissected and explored in the international project Deep Cities (EU-JPI 2020-2022) that she co-designed, where she co-led a work package and commissioned several publications, conferences, and audiovisual materials. This leadership experience helped her to develop her own research project on the ethics of care and intersectional critical perspectives applied to cultural heritage studies and conservation that took her to Norway, Scotland, and the Autonomous University of Barcelona (Margarita Salas Fellowship). Prior to the beginning of her position at the GCI, Ana has been the PI of a pioneering conservation and co-research heritage project linked to the study and restoration of the Cardboard Hospital in Capdella (Lleida, Spain) as a pilot pioneer in Spain in community archaeology and conservation (Pastor Pérez and Remacha Acebrón 2024a, 2024b, 2024c). She also collaborates with four different research groups on more than five R&D projects implementing sustainable and people-orientated research. Dr. Pastor also delivers lectures, collaborates with teaching innovation projects, co-supervises PhD students, and promotes stronger connections between academics, practitioners and general public. In addition to disseminating her advances in more accessible formats, her future line of work aims to explore citizen science as applied to the conservation of archaeological heritage.

Resumen del Currículum Vitae:

Dr. Ana Pastor Pérez is a senior research project specialist in archaeological collections at the Getty Conservation Institute. She is a researcher and lecturer with a background in conservation, critical heritage studies, cultural heritage management, and social archaeology. In her current project, SPAC, she has designed a five-year capacity-strengthening project in Perú. She is one of the most cited authors in Spain in cultural studies, authoring more than 35 publications, including more than 18 articles in peer-reviewed journals and 2 edited books on cultural heritage management. Over the last few years, she has attended several events to disseminate knowledge, connect stakeholders, develop new lines of research, and configured international networks in the field of critical heritage studies. Dr. Pastor started her studies in history and archaeology at the Autonomous University of Madrid (2004) and continued with a degree in conservation and restoration of archaeological cultural heritage (2007) at the ESCRB of Madrid. Following these experiences, various internships took place in intriguing locations like the Instituto del Patrimonio Mundial Español (IPCE) or the Louvre Museum in France (2007). She relocated to Barcelona after completing a course at ICCROM (2012) in order to pursue an MA in Cultural Heritage Management at the University of Barcelona (2012-2014) with funding from the Obra Social la Caixa (Extraordinary Prize 2014). She has been a visiting researcher at the ICCROM (ITA), IPCE (ES), the INP (FR), and the Louvre Museum (FR). Dr. Pastor has helped to secure more than 400K EUR for the University of Barcelona and other institutions in the past years. She participated as a research assistant in the Heritage Values (H@V) project (2014-2015), followed by an innovative PhD on social conservation and ethnographic techniques in the Culture and Society program of the University of Barcelona (2019). Afterwards, Dr. Pastor received a postdoctoral researcher position at the EU-JPI Curbatheri Deep Cities project (2020-2022) as a WP co-coordinator, followed by a postdoctoral researcher position within the Margarita Salas Program (AEI). This permitted her to boost her international projection at the NIKU in Oslo (2022-23) and different institutions in Scotland, such as the University of Stirling (UK), the University of Edinburgh (UK), and, back in Catalonia, the Autonomous University of Barcelona (2023-24). These collaborations have generated articles, sessions, and teaching exchanges. Dr. Pastor is also a member of the SGR DIDPATRI and collaborates with different masters and degrees for lecturing and mentoring purposes and on several I+D+i projects: CIPAMUR at the Complutense University of Madrid and PIMUS+, MAESTROM, and DipCult at the University of Barcelona. From 2021 till her incorporation at the GCI in 2024, she has been the PI of community heritage works and actions in the interdisciplinary team for the restoration of the "Cardboard Hospital of Capdella," carrying out ground-breaking actions in the field of conservation and community archaeology. Dr. Pastor is a committed academic on dissemination, participating in more than 30 events in the last three years. In this line, she is the chair of the Equality and Intersectionality Commission of ICOMOS Spain.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: PEDREGAL VILLODRES, ALEJANDRO
Referencia: RYC2025-056828-I
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Título: Toward a Theory of the Ecopolitical Unconscious: Sovereign Social Metabolism and Cultural Practices of Resistance

Resumen de la Memoria:

My research trajectory has been built at the intersection of cultural and artistic studies, political ecology, and world-systems analysis, and has developed through sustained international collaboration. It began with doctoral and postdoctoral work on Latin American militant cinema and testimonial literature at Aalto University, crystallising in the book *Evelia* (2018), which integrated cultural critique with the study of extractivism and ecological imperialism. This foundation enabled my contributions as a researcher to major Spanish CSIC projects (*Estética fósil*, *HUMENERGE*), where I advanced frameworks from eco-Marxism and the environmental humanities.

A definitive marker of my research independence is my successful acquisition and leadership of the project *Cinema, Fossil Modernity and the Ecosocial Crises of the Anthropocene* as Principal Investigator (Research Council of Finland, 3564,891, 2023-2027). My scholarly output, evidenced by my serving as corresponding author on articles in leading journals such as *Third Text* and the *Journal of Labor and Society*, develops original concepts, including the *aesthetic rift*, and critiques *green imperialism*. This work culminates in the monograph *Incendios* (Verso, 2025), a systematic theorisation of *flammable capitalism* whose public impact includes op-eds in *El País* and *Al Jazeera*.

My academic leadership extends to roles as Associate Editor of the *Journal of Labor and Society*, co-designer of Aalto University's University-Wide Art Studies curriculum, and organiser of international workshops, seminars, and conferences like the Radical Film Network Biannual Conference (Madrid, 2024).

The proposed research line, *Toward a Theory of the Ecopolitical Unconscious: Sovereign Social Metabolism and Cultural Practices of Resistance*, is the logical synthesis of this trajectory. It aims to construct a novel framework for analysing how anti-colonial cultural practices historically engaged with material and metabolic constraints, offering vital conceptual resources for contemporary ecosocial debates such as those on degrowth and delinking. This project will leverage my transnational networks to produce a comparative, historically grounded analysis with significant implications for imagining just socio-ecological futures on a planetary scale.

Resumen del Currículum Vitae:

My research programme is situated at the intersection of cultural and artistic practices, political ecology, and world-systems analysis. It investigates the socio-ecological dimensions of cultural production, with a focus on anti-imperialist and anti-colonial traditions. A key indicator of research independence is my role as Principal Investigator of the project *Cinema, Fossil Modernity and the Ecosocial Crises of the Anthropocene*, funded by the Research Council of Finland (3564,891, 2023-2027). This builds upon sustained international collaboration, including research positions in major Spanish CSIC projects (*Estética fósil*, *HUMENERGE*), and a visiting researcher affiliation at Aalto University's Department of Art and Media.

Peer-reviewed articles in leading international journals characterise my scholarly publication record. I have developed key conceptual contributions as corresponding author, including eco-Marxist analysis in *Third Text* (2023), political-economic synthesis of ecological imperialism in the *Journal of Labor and Society* (2024), and a socio-ecological examination of *Tricontinental* in *Agrarian South* (2024). My recent monograph, *Incendios: Una crítica ecosocial del capitalismo inflamable* (Verso, 2025, foreword by John Bellamy Foster), extends this work into a systematic critique of *flammable capitalism*. The book's reception has led to invitations for public commentary in media such as *El País* and *Al Jazeera*. I contribute to scholarly dissemination as Associate Editor of the *Journal of Labor and Society* and as guest editor of its 2025 special issue, *The Imperialist Features of Ecomodernism*, which includes works by leading scholars Jason Hickel, Mariko Lin Frame, Max Ajl, and David Myer Temin, among others.

My academic service includes substantial experience in curriculum design, doctoral training, and event organisation. I co-designed the transdisciplinary curriculum for Aalto University's University-Wide Art Studies programme, served as academic director for the Kone Foundation-funded Academy of Moving People and Images (3616,580), and participated in doctoral supervision and admissions committees at Aalto University. I have coordinated several international academic events, such as the Radical Film Network Biannual Conference (Madrid, 2024) and an invited doctoral seminar at the Royal College of Art (2025).

This integrated profile combining competitive funding, international publication, editorial work, and academic leadership demonstrates a consistent capacity to develop independent research and to engage with both scholarly and public spheres on the socio-ecological challenges of contemporary cultural production.



MINISTERIO
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte

Nombre: TAGGART, DECLAN

Referencia: RYC2025-054678-I

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Título: Old Norse Philology

Resumen de la Memoria:

I am an internationally recognized scholar of Old Norse literature, whose philological research has significantly advanced our understanding of early ideologies, society and religion. Trained in Old Norse and Latin, proficient in Spanish and Swedish, and a native English speaker, I integrate close readings of medieval texts with insights from fields like cognitive science to challenge entrenched assumptions and establish new paradigms in areas such as warriorhood, morality and divine agency.

My monograph *How Thor Lost His Thunder* (Routledge, 2018) – widely cited, positively reviewed and prize-winning – exemplifies my methodological innovation, drawing on cognitive models to reinterpret Old Norse myth. As the first sustained application of a cognitive-philological methodology in Old Norse studies, the book has been influential, as demonstrated by the substantial body of subsequent scholarship adopting this approach – so extensive that I organized the second of my three conferences on the topic.

My research appears in high-ranking, Open Access journals with notable H-indexes, including *The Journal of English and Germanic Philology*, *Religions*, *Journal of Cognition and Culture*, *Journal of Anthropological Archaeology* and *Early Medieval Europe*. I have contributed chapters to international collections and edited the Brepols volume *Making the Profane Sacred in the Viking Age*. These outputs – ranging from close readings of Old Norse poetry to theoretical work on morality and warriorhood – have shaped key conversations in Old Norse studies, which is reflected in my citation record, almost 50 academic talks – including 18 invited or keynote lectures across the world – and repeated collaborations with leading scholars.

I have held six competitive research fellowships in four countries, totalling €968,705, alongside multiple prizes, grants and smaller awards. Currently, at the University of Iceland, I am a core member of the NordForsk project “Making a Warrior” (2024), collaborating with researchers at three other centres to redefine Viking Age warriorhood for the first time in a generation. I am Principal Investigator of “With the Help of the Gods” (University of Iceland Research Fund), and previously led the Icelandic Research Fund project “Fickle Friends” on Viking Age morality, following IRC and Royal Gustavus Adolphus Academy fellowships on Old Norse gods. The balance of mobility and independence with leadership and collaboration evident in these roles has been a hallmark of my career.

I am committed to effective knowledge exchange, so that high-quality research informs wider understandings of the medieval North. I publish Open Access, and I have consulted on a museum exhibition with over 70,000 visitors (shortlisted for a National Geographic award) and authored two Viking games played by 10,000 users. My public-facing work – including interviews for e.g. National Geographic and *The Medieval Podcast* – extends the reach of philology far beyond academia.

Stays in Uppsala and Aarhus illustrate the breadth of my network and dedication to scholarly collaboration. I have taught at the University of Aberdeen and led reading groups and initiatives at UCC. As a series editor for Trivent’s “Old Norse Studies”, I am shaping the direction of research in the field. I am keen to foster new researchers and will integrate early-career scholars into future European grants.

Resumen del Currículum Vitae:

My career has been characterized by a sustained philological engagement with Old Norse texts, with a particular focus on how pre-Christian Scandinavian religion, morality and social structures are articulated in poetic, mythological and narrative sources. Beginning with my doctoral training at the University of Aberdeen – one of the foremost global centres for Old Norse Studies – I have built an international research profile grounded in close reading, linguistic precision and sensitivity to genre, manuscript context and cultural memory. This philological foundation continues to anchor my scholarly work.

A groundbreaking aspect of my PhD thesis’s contribution to scholarship was its harmonizing of this rigorous textual analysis with theories of cultural transmission from the cognitive sciences. My monograph *How Thor Lost his Thunder* (Routledge, 2018), based on that thesis, was awarded a prize for pioneering research by Sweden’s Royal Gustavus Adolphus Academy and has been positively reviewed, underscoring its significance and innovation. My PhD continues to shape scholarship: its findings are widely cited, and many scholars have since taken up my cognitive-philological approach.

My nearly €1M in competitive funding reflects the recognition and momentum of my work. Across postdoctoral fellowships in Stockholm, Cork and Reykjavik, I broadened my research to examine how literary evidence illuminates religious practice, moral norms and social structures. This development informs my role in the NordForsk-funded “Making a Warrior” project, in which I bring philological expertise to an interdisciplinary team of archaeologists and historians working across four institutions. Through this project and others, I have helped lead a major re-evaluation of Viking Age warriorhood and its social implications.

Alongside these collaborations, I have pursued an independent trajectory as Principal Investigator on “With the Help of the Gods”, which investigates conflict resolution in myth and ritual through early prose, poetry and toponymy. Involving supervision of a research assistant and further international collaboration, it demonstrates my growing leadership and builds on my experience mentoring MA and PhD students.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My research trajectory is underpinned by the establishment of new international networks and research communities. I have organized three major conferences: on warriorhood, the Scandinavian diaspora and cognitive-philological methodologies, the last of these to consolidate the rapidly growing subfield that has emerged from my own PhD research. My mobility across celebrated scholarly centres in Scotland, Sweden, Ireland, Denmark and Iceland has likewise shaped my scholarly development and facilitated the expansion of my investigations through interdisciplinary collaboration. As a series editor for *Triventus Old Norse Studies*, I contribute to setting future directions in philological research.

Throughout my career, I have sought to unite philological rigour with interdisciplinary innovation as a means of reassessing fundamental aspects of Old Norse myth, morality and social organization. Looking ahead, my work will continue to develop new theoretical frameworks for understanding medieval Nordic literature and societies while strengthening the international networks that support cutting-edge research in Old Norse studies.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: TIROSH, YOAV
Referencia: RYC2025-055048-I
Correo Electrónico: tiroshyoav@gmail.com
Título: Disability in Medieval Literature and Culture

Resumen de la Memoria:

I began my academic career interested in medieval history, although I quickly moved on to the greener pastures of medieval literature, concentrated on Old Norse-Icelandic saga literature. My interest in sagas initially focused on issues of blood feud and gender, on which I wrote my Master's thesis. I then decided that I must get to the bottom of saga literature manuscripts, genre and composition, and dedicated my doctoral thesis to Old Norse philology, focused on a specific saga that has several interesting features about it. Following my graduation, I was invited to participate for a year in a project dedicated to disability studies in the sagas, and there I found a new passion of reading medieval literature by focusing on embodied difference. In the study of disability I became more engaged with the interdisciplinary interactions between Humanities and Social Sciences, as well as more invested in social history and intersectional concerns that govern human interaction. This connects my interest in disability with my older concern with issues of gender and sexuality. It is my aim to reconcile both themes: I have already ventured towards this in my articles that deal with deafness and its influence on how individuals participate in their society.

I have not lost my interest in literature, however, and I have recently published a book with Palgrave MacMillan's The New Middle Ages series, called How Genre Governs Creation in the Medieval Icelandic Sagas. There I apply observations from the study of genre in television and cinema on saga literature. This means that I used modern concepts of authorship and genre in order to break a kind of theoretical stalemate that was created by saga research and its general avoidance of questioning old truths about the composition and generic division of these texts. I found the work of Rick Altman particularly fruitful: both his approach that looks at generic categories as tied to production consideration and paratext, and also his idea of generic crossroads, which reconciles approaches that treat genre as a stabilizing force in society vs those approaches that consider genre as disruptive. The key, Altman shows, is in treating genre as both things, and finding the moments where the narrative must choose between different societal forces. My interest in the construction of literature also lead me to investigate the construction of memory, more specifically collective memory and the idea that societies construct their cultures around formative narratives. Since my early academic writing I have always thought of literature as a form of memory construction that is meant to sway people to certain political, cultural and ideological choices. The peak of my interest in memory lead to my cooperation with then-PhD-student Simon Nygaard to create special sessions for the International Medieval Congress at Leeds University, which then continued to a special edited issue of Scandinavian Canadian Studies. After this, I decided to turn to the darker side of memory, namely individual trauma and collective trauma, which resulted in my MSCA fellowship application about trauma in medieval Europe. This has become quite a promising avenue of research, and I have some significant publications on this topic that are forthcoming, including a theoretical article on trauma and the paranormal, as well as a edited volume.

Resumen del Currículum Vitae:

In the last 11 years, since I began my doctoral studies, I have published a book (with Palgrave Macmillan), 11 articles in peer reviewed journals, 10 peer reviewed book chapters, 2 conference proceeding chapters, 2 journal special issue introductions, 7 encyclopedia entries, 7 book reviews in academic journals (including for the prestigious journal of medieval studies Speculum (University of Chicago Press), Social History of Medicine (Oxford University Press), and regularly for Saga Book (Viking Society for Northern Research), a journal that is highly respected and influential in the field of Old Norse studies), and around 15 articles in the popular website medievalists.net. My main research topics have been disability studies, trauma, gender and sexuality, collective memory, literary analysis, and philological work, centered around the medieval Icelandic sagas from literary and historical perspectives. Since 2014 I have 138 citations, which according to Google Scholar gives me a 7 in the h-index system, and 3 in the i10-index system i10-index system. Before discontinuing my academia.edu account due to ethical issues with its use of intellectual property, I had always moved between the top 3%-5% in that website's metrics.

My academic career has been very international from its onset: during my MA studies in the University of Iceland's Viking and Medieval Norse Studies program (2012-2014), I spent a full semester at Aarhus University as an exchange student. During my doctoral studies, I spent a semester in 2015 at the University of Silesia in Katowice, Poland, funded by a Polish Scholarship and Training Fund exchange. In 2017 I spent a semester in Aarhus, Denmark, in an Erasmus+ training project, where I worked on my editing and teaching skills. During the COVID pandemic I taught virtual courses for several semesters at the University of Münster, Germany, and in Katowice. Since 2021, I have given 22 lectures and papers in international centers and conferences, including invited lectures and a book launch event. In terms of my dissemination activities, I participated for 5 years in organizing a student conference, led special sessions and strands at international conferences, and also organized a workshop and roundtable with international participants.

Since graduating from my doctoral studies in 2019 I have developed my research and organizational independence, as well as advanced in my leadership capabilities. Most notably, my work in disability studies has significantly improved my ability to take on new and challenging research fields and find ways to contribute to their advancements. My work on my MSCA fellowship at Aarhus University gave me unique opportunities to develop my administrative skills, event organization and funding application. I have also acquired teaching education and supervising skills in the last few years.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Cultura: filología, literatura y arte

Nombre:

RIVIÈRE RÍOS, HENAR

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RYC2025-057057-I

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Título:

Arte intermedia y escritura experimental internacional entre 1960-1990

Resumen de la Memoria:

La candidata ha desarrollado una trayectoria investigadora de marcado carácter internacional y coherencia temática en torno a cuatro líneas de investigación interrelacionadas, centradas en las prácticas artísticas expandidas que empezaron a fraguarse a finales de los años 1950 a nivel global en el contexto del arte intermedia, dando lugar al giro performativo y conceptual de las artes. La candidata aborda estas prácticas artísticas desde la historiografía del arte, pero atendiendo a su naturaleza interdisciplinar e intermedial, así como a su carácter inter- y transnacional. Su primera línea de investigación se centra en los orígenes musicales de lo que hoy se conoce como arte de performance, mientras que la segunda aborda la escritura experimental que atraviesa a estas prácticas artísticas. Sus otras dos líneas se concentran en analizar el modus operandi de los exponentes de estas prácticas poniendo el foco, por un lado, en su noción expandida de archivo y, por otro, en las redes transnacionales de intercambio artístico que establecieron durante en las décadas entre 1960 y 1990. Sus líneas de investigación en torno a la escritura experimental y las redes de artistas se han consolidado mediante su actual liderazgo como IP1 del Proyecto Generación de Conocimiento ESCON: Escrituras en contacto. Redes de escritura intermedial en la era de la globalización analógica (1961-1991) (PID2024-159610NB-I00). Para la presente convocatoria Ramón y Cajal, Rivière propone desarrollar una línea de investigación que conecta con uno de los ejes fundamentales de este proyecto: el arte correo (mail art) y sus redes entre el Cono Sur, Italia y las dos Alemanias durante la Guerra Fría (1961-1991). En el arte correo confluyen todas sus líneas previas de investigación. Si bien ya le ha dedicado algunas publicaciones de alto impacto a esta temática, la línea aquí propuesta supone expandir sus investigaciones a través de una atención sistemática tanto a la materialidad específica de esta forma de práctica artística, como a las particulares redes de colaboración internacional que establecieron con ella sus exponentes, en un contexto marcado por la división del mundo en dos bloques geopolíticos antagónicos. La candidata propone para ello un enfoque novedoso que supera los binarismos que han marcado las aproximaciones al arte correo en las últimas décadas, y rescata la obra y las redes de artistas escasamente investigadas hasta la fecha a través de una exhaustiva labor de archivo.

Resumen del Currículum Vitae:

Doctora en Historia del Arte con una tesis sobre El nacimiento de Fluxus en Alemania y su recepción crítica (2015), la candidata es Profesora Ayudante Doctora en el Departamento de Historia del Arte de la UCM desde 2022, así como IP1 del Proyecto de Generación de Conocimiento ESCON: Escrituras en contacto. Redes de escritura intermedial en la era de la globalización analógica (1961-1991) (PID2024-159610NB-I00) desde septiembre de 2025, y tiene un Sexenio de investigación vivo. En el pasado, ha sido beneficiaria de diferentes contratos nacionales e internacionales altamente competitivos. Entre los nacionales, destacan sendos contratos posdoctorales Juan de la Cierva Formación (Facultad de Bellas Artes, UCLM) e Incorporación (Departamento de Historia del Arte, UCM), así como un contrato predoctoral FPU (Departamento de Historia del Arte Contemporáneo, UCM). Entre las becas internacionales, en 2024 y 2025 ha realizado dos estancias de 3 y 2 meses respectivamente, financiadas por el DAAD (Servicio Alemán de Intercambio Académico), como investigadora invitada en prestigiosos centros de investigación de Berlín y Bremen. En su etapa posdoctoral disfrutó de una beca de 8 meses en el Getty Research Institute de Los Ángeles y en la predoctoral obtuvo, entre otras, la prestigiosa beca de la Caixa para estudios en Alemania. La internacionalidad de su perfil, así como su independencia y capacidad de liderazgo se reflejan asimismo en su inclusión, desde el inicio de su carrera, en redes y proyectos de gran relevancia para sus temas de investigación en torno a las prácticas artísticas intermediales, performativas y conceptuales de la segunda mitad del s. XX. Desde su participación como investigadora en un proyecto internacional financiado por los HKF de Berlín en su etapa predoctoral, la candidata ha contribuido con sus investigaciones a publicaciones y conferencias de alto impacto en Alemania, Hungría, Francia, Polonia, Holanda o Suiza, asumiendo a menudo el rol de iniciadora y organizadora. Asimismo, ha sido miembro de 7 proyectos I+D en convocatorias competitivas nacionales (5 de la AEI y 1 de la FECYT), y ha sido IP de un proyecto de investigación individual a través de un contrato Art. 83 LOU entre la UCM y el Archivo Lafuente (2021-2022), donde previamente ejerció el cargo de Responsable de Investigación y Proyectos.

La originalidad de sus líneas de investigación, especialmente en torno a la noción de archivo, la escritura experimental y la conectividad global como práctica artística (arte correo), está dando frutos también a través de su actividad docente, con la dirección de 3 tesis doctorales en curso vinculadas y la tutorización de 10 TFM's ya defendidos relacionados con estos temas (además de otros vinculados a otros temas). Ha liderado dos proyectos de Innova-Docencia vinculados al tema de la escritura con alta participación de estudiantes y PDI en formación, y ha impartido más de 800 horas de docencia entre el prestigioso Máster Universitario en Historia del Arte Contemporáneo y Cultura Visual (UAM-UCM y Museo Reina Sofía), y los Grados en Historia del Arte, Historia y Filosofía (UCM) y Bellas Artes (UCLM).

La candidata ha desarrollado una importante labor de transferencia a través del comisariado de exposiciones nacionales e internacionales, como la que prepara actualmente para Museo Reina Sofía en el marco de un Art. 60 LOSU.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Cultura: filología, literatura y arte

Nombre:

RUIZ FABO, PABLO

Referencia:

RYC2025-056720-I

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Título:

Digital Humanities, Computational Literary Studies and Computational Linguistics

Resumen de la Memoria:

My research sits at the intersection of Natural Language Processing (NLP) and Digital Humanities (DH), with two main lines: developing NLP technologies for corpus exploration and applying NLP to literary analysis, especially in peripheral literatures and low-resource languages.

During my PhD, funded by the Paris/Île-de-France region, I created entity-linking and relation-extraction methods to map actors and relations in large corpora, applying them to international climate diplomacy documents and to Jeremy Bentham's manuscripts. I also built exploration interfaces validated by domain experts.

Since my postdoctoral period in Spain and France, I have focused on Computational Literary Studies, designing NLP methods for automatic annotation of poetic and dramatic features, such as enjambment in poetry or types of stage directions in theater. I have also worked on automating TEI encoding through symbolic approaches and machine learning, and have been member, work-package leader or PI in competitively funded projects.

I have been permanent faculty in Strasbourg since 2018. As PI of two funded projects, I led the creation of the first large, open-licensed TEI-encoded corpus of Alsatian theater (77 plays, over 600,000 words), along with NLP resources for emotion analysis and a public exploration interface. This advances access to cultural heritage and supports under-resourced language varieties.

Currently on research leave at CiTIUS (USC, Compostela), since April 2025 I have been PI of a Marie Skłodowska-Curie project on the computational analysis of 19th-century Galician literature, comparing it with Portuguese and Spanish traditions to examine how dominant models may have shaped a peripheral canon. I have produced the first open automatic metrical scansion system for Galician poetry.

I have authored 11 journal articles, including in Digital Scholarship in the Humanities, Digital Humanities Quarterly and Language Resources and Evaluation, and published full articles at major NLP venues, including a demonstration at NAACL (a top venue) and six papers at LREC, *SEM, SemEval and LaTeCH-CLfL (on computational linguistics for literature). I have presented 11 contributions at the ADHO DH conference. My Google Scholar profile counts 353 citations, with h-index 10 and i10-index 11, and my collaborations include co-authors from Germany, Spain, Switzerland and the UK.

My early NLP work took place in industry collaborations in the Basque Country, developing prototypes and production components for social media analysis and automatic subtitling.

Recent projects on Alsatian and Galician literature address digitally underrepresented languages; we have released open corpora and software contributing to cultural heritage access and digital language equality. I have also participated in public outreach events such as the 2023 Fête de la science and the 2022 Open Access Month.

I have supervised 19 master's theses, served on 32 master's committees and tutored 15 internships. I have been part of PhD committees in Spain and France. I co-edited a book on Computational Stylistics (De Gruyter) and a special issue of the Journal of Data Mining and Digital Humanities, and regularly review for NLP and DH venues. I serve on the steering committees of the Plotting Poetry Computational Stylistics group and the ADHO Digital Literary Stylistics SIG.

Resumen del Currículum Vitae:

My journal and conference work in Computational Literary Studies (CLS) spans several topics. For the CVA, I selected two papers at LaTeCH-CLfL, a leading venue in NLP for literature. The first is on the automatic detection and classification of enjambment in Spanish poetry. The other one addressed the automatic classification of stage directions in French theater using transfer learning (a machine learning approach), in collaboration with a student I supervised. I also highlighted a publication on the Diachronic Spanish Sonnet corpus (DISCO), at Digital Scholarship in the Humanities, a leading DH journal (SJR Q1). This richly annotated corpus has been reused for training models in rhyme and rhyme-scheme detection.

Moving on to CLS for peripheral literatures / low-resource languages, I included a chapter that synthesizes the MeThAL project on developing resources for Alsatian theater. The chapter's volume, at De Gruyter, stems from the first Computational Drama Analysis workshop, hosted by a leading group in Cologne (QuaDrama). It is a good validation of our project's work. Further validation was given by invited talks, one at Universidade NOVA in Lisbon, an important DH group, which hosted DH2025. I also included our article on a quantitative reassessment of Philippine Modernism (Ogigia, Q1) created with domain specialists, where I contributed programming for prosodic analysis and corpus encoding. A further CLS output is my co-edited volume on computational stylistics (De Gruyter, 2022), with Swiss and Czech colleagues.

My second research line concerns earlier work applying NLP to Humanities issues and reflecting on NLP methodology. This includes work on entity linking (corpus concept linking to knowledge bases like Wikipedia) and relation extraction (published at *SEM and LREC) and a position paper in Digital Humanities Quarterly. I also delivered an invited talk at Spain's National Library on the role of NLP in digital scholarly editing.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

The remainder of my CVA highlights international project leadership and participation. As a PI, I currently lead a Marie-Curie-funded CLS project in Compostela comparing 19th-c. Galician, Portuguese, and Spanish literature at scale. I was also the PI of MeThAL and Thealtres, on Alsatian theater, funded by competitive calls at the University of Strasbourg and Maison Interuniversitaire des Sciences de l'Homme. We built pioneering resources (TEI corpus, NLP resources and a public corpus navigation interface), and compared this tradition with its major influences: German and French drama.

Before my PhD, at the applied research center Vicomtech (Basque Country), I served as PI on a regional technology-transfer project on NLP for social media (Twitter Leads) and co-coordinated Ber2Tek, a speech and language technology project for Basque. I also contributed to several European NLP and speech projects.

As a postdoc, I led the NLP applications work package (2017-2018) in the POSTDATA ERC project, on NLP and the semantic web for poetry analysis.

As a project member, I participated in the DiViTAL project (French national funding) on linguistic resource creation for regional languages of France. I was also a member of PoEMAS and its extensions, with Spanish state funding and hosted at UNED (2019 onwards); this studies the links between Spanish poetry and popular music since 1975 using DH approaches.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: LOPES DE BARROS OLIVEIRA, RODRIGO
Referencia: RYC2025-057332-I
Correo Electrónico: rlpsbarros@gmail.com
Título: Radical Politics in Contemporary Poetry and Visual Art in the Americas (2012 to 2022)
Resumen de la Memoria:

I am currently a Profesor Ayudante Doctor of English Philology at the University of the Balearic Islands. I was until recently a Research Affiliate in the Department of Romance Languages & Literatures at Harvard University and the Director of the Cinema & Media Studies Program at Boston University, in addition to being the Head of the Portuguese Section (including the undergraduate program in Portuguese & Brazilian Cultural Studies), and an Assistant Professor of Spanish, Portuguese, and Latin American Studies at the same institution. I hold a PhD in Hispanic Literature from the University of Texas at Austin (with a focus on Brazilian and Caribbean cultures), having also holding visiting and lecturer positions at institutions such as Harvard University, Federal University of Espírito Santo, and the University of Massachusetts Boston. My areas of specialization are the literature and the audiovisual and cultural studies of Brazil and the Caribbean.

Since obtaining my MA in Literary Theory at the Federal University of Santa Catarina and my PhD at the University of Texas at Austin, I have continuously conducted research on the literary, audiovisual, and cultural productions of Brazil and Hispanic America from the 20th and 21st centuries. I have written so far 1 single-authored monograph; 2 critical edition books; 1 edited book; 7 scientific articles in academic journals; 7 book chapters; 2 special issues in academic journals; 7 articles in conference proceedings and catalogs; 1 fiction book; 29 reviews, prefaces, interviews, literary texts, and other similar publications; 2 book translations; and 10 translations of articles, essays and synopses. These publications were conducted in three languages (English, Spanish, and Portuguese).

Over the next 5 years, I intend to expand upon and take a step beyond my monograph, *Distortion and Subversion* (Liverpool University Press), which covers the years 1996 to 2011, to develop a new research project titled *Radical Politics in Contemporary Poetry and Visual Art in the Americas (2012-2022)*. This project aims to analyze the literary and visual legacy produced by avant-garde poets and artists from the Americas during the politically and socially tumultuous years between 2012 and 2022. This period was marked by significant protests and political changes in several American countries, including the impeachment of leftist presidents (such as in Brazil), urban uprisings (such as in Chile), and anti-racist demonstrations (such as in the United States). Through this project, I seek to explore how poetry and visual arts responded to and influenced these sociopolitical processes, offering critical and innovative perspectives on the cultural and political landscape of the region.

Resumen del Currículum Vitae:

Rodrigo Lopes de Barros es un investigador, crítico cultural, cineasta, escritor y actualmente Profesor Ayudante Doctor de Filología Inglesa en la Universidad de las Islas Baleares. Ha ocupado diversos puestos académicos a lo largo de su carrera. Fue Investigador Afiliado en el Departamento de Lenguas y Literaturas Romances de la Universidad de Harvard y Profesor Asistente (tenure-track) de Español, Portugués y Estudios Latinoamericanos en la Universidad de Boston. También en la Universidad de Boston, ejerció funciones de liderazgo como la dirección de tesis doctorales y como Jefe de la Sección de Portugués y Director del Programa de Estudios de Cine y Medios, lo que incluía la supervisión de la contratación de personal investigador predoctoral y posdoctoral. Tiene un máster en Teoría Literaria por la Universidad Federal de Santa Catarina, este último con una beca del CNPq (Consejo Nacional de Desarrollo Científico y Tecnológico de Brasil). Obtuvo un doctorado en Literatura Hispánica en la Universidad de Texas en Austin. Además, realizó una estancia postdoctoral en la Universidad de São Paulo con una beca de FAPESP y fue invitado a desempeñarse como profesor visitante en la Universidad de Harvard y en la Universidad Federal de Espírito Santo. Sus intereses académicos incluyen la relación entre etnografía y literatura, el cine de vanguardia y el arte contemporáneo en Cuba y Brasil, así como las conexiones entre arte, música e historias nacionales.

Lopes de Barros es autor del libro "*Distortion and Subversion: Punk Rock Music and the Protests for Free Public Transportation in Brazil*" (1996-2011) (Liverpool University Press). En esta obra, utiliza métodos de ciber-arqueología de sitios web, investigación de archivos y entrevistas para analizar cómo la escena de música punk y hardcore brasileña se unió a militantes políticos para fomentar un nuevo movimiento social. El PDF del libro está disponible en acceso abierto y esta monografía ha recibido hasta el momento nueve reseñas en revistas científicas especializadas, incluyendo *Hispanic Research Journal*, *Journal of Lusophone Studies*, *International Association for the Study of Popular Music (IASPM) Journal*, *LL Journal*, *Journal of Popular Music Studies*, *American Music*, *Journal of Latin American Geography* y *North American Congress in Latin America (NACLA)*.

Como cineasta, Lopes de Barros dirigió los documentales "*Chacal: Prohibido Hacer Poesía*", con el que recibió el Premio al Mérito en Cine de la Latin American Studies Association (LASA), y "*Ricardo Aleixo: Afro-Atlántico*", galardonado con el Premio Pierre Verger en Cine Etnográfico de la Asociación Brasileña de Antropología. También dirigió el híbrido "*Ménage Literario: Una Investigación sobre la Escritura de Jacques Fux*", que se publicó como un libro DVD trilingüe (Relicário Edições), y el cortometraje de ficción "*El Cuerpo*".

Otros ensayos de Lopes de Barros sobre las culturas brasileña y cubana han aparecido como capítulos de libros y artículos en revistas como *Afterimage*, *Comparative Literature Studies*, *Topoi* y *Alea*. Fue coeditor del libro "*Ruinologías*" (EdUFSC). Como escritor literario, fue uno de los ganadores del concurso cultural *Caderno 2* en los 450 Años de São Paulo, organizado por el periódico *O Estado de São Paulo*.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: SERRANO MUÑOZ, JORDI
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Título: Narrativas del desastre y crisis climática: un estudio transpacífico comparado

Resumen de la Memoria:

Mi investigación aborda uno de los retos críticos de nuestro tiempo: cómo la narrativa puede ayudarnos a comprender y responder a la crisis climática. Mi trabajo se encuentra en la intersección entre la literatura comparada, la ecocrítica y los estudios de área. Desarrollo un marco metodológico innovador que conecta la teoría narrativa con los estudios sobre desastres desde una perspectiva transcultural y decolonial.

He construido una trayectoria internacional sólida con estancias postdoctorales en cuatro países. Actualmente desarrollo un proyecto Marie Skłodowska-Curie en la Universidad de Gante (2025-2027), tras estancias en la Universidad de Waseda (Japón, 2021-2022) y El Colegio de México (2020-2021). Esta movilidad no ha sido solo geográfica, sino también intelectual, permitiéndome tender puentes entre comunidades académicas que raramente dialogan: los estudios japoneses, los estudios latinoamericanos y las humanidades ambientales.

Mi producción científica refleja este compromiso con el diálogo transcultural: he coeditado el volumen *East Asia, Latin America, and the Decolonization of Transpacific Studies* (Palgrave Macmillan, 2022), que propone renovar las conexiones entre Asia Oriental y América Latina desde perspectivas epistemológicamente críticas. He publicado trece artículos en revistas de reconocimiento internacional, explorando desde la canonización de la literatura japonesa en mercados globales hasta la representación de trauma y memoria en ficción especulativa. Mi versatilidad investigadora me ha llevado también a participar en proyectos sobre innovación docente (INDOVIG) y circulación de industrias culturales (GREGAL, TRAMEVIC).

Más allá de la producción académica tradicional, considero fundamental democratizar el conocimiento. Copresento *Está por Leer*, un podcast sobre literatura asiática contemporánea que alcanza miles de oyentes hispanohablantes. He impartido cursos para público general, profesorado de secundaria y estudiantes de ingeniería, traduciendo conceptos complejos de teoría literaria a formatos accesibles. Fundé en 2012 *Asiademica*, revista que ha publicado los primeros artículos de decenas de jóvenes investigadores, ofreciéndoles mentoría editorial en sus primeros pasos académicos.

Mi línea de investigación examina cómo la ficción de desastres lentos configura lo que denomino "vulnerabilidad planetaria": una conciencia compartida, transcultural y no-antropocéntrica del riesgo ambiental. A diferencia de las narrativas de desastres súbitos y espectaculares, las narrativas de degradación ambiental gradual enfrentan el desafío de representar procesos lentos, desiguales y a menudo invisibles. ¿Cómo narra la ficción el cambio climático cuando sus efectos se despliegan a lo largo de décadas? ¿Cómo imagina la literatura futuros marcados por la incertidumbre ambiental? Abordo estas preguntas mediante un corpus transpacífico (México, Japón, Australia) que permite comparar cómo distintas tradiciones culturales generan estrategias narrativas diferenciadas. Esta investigación promete impactos tanto teóricos como prácticos: avanzar la econarratología más allá de corpus euro-americanos, establecer puentes entre estudios literarios y ciencias de la sostenibilidad, y contribuir a un diálogo más plural dentro de las humanidades ambientales.

Resumen del Currículum Vitae:

Soy doctor en Humanidades por la Universitat Pompeu Fabra (2019, cum laude), con máster de investigación por la Universidad de Leiden (2015, cum laude) y grado en Estudios de Asia Oriental por la UAB (2013, premio extraordinario de promoción). Esta trayectoria refleja mi vocación comparatista y mi interés por conectar perspectivas teóricas diversas aplicadas en concreto a objetos de estudio asiáticos y latinoamericanos.

Mi principal contribución científica es el desarrollo de marcos metodológicos innovadores para estudiar la imaginación ambiental en contextos no-occidentales. Combino econarratología (el estudio de cómo las formas narrativas median nuestra comprensión de cuestiones ecológicas) con estudios de desastres, aplicado a narrativas asiáticas y latinoamericanas. Esta innovación metodológica se plasma en dos monografías, trece artículos en revistas internacionales revisadas por pares, cinco capítulos de libro y la edición de un número especial sobre ficción climática.

He demostrado capacidad para asegurar financiación competitiva internacional: actualmente desarrollo un proyecto Marie Skłodowska-Curie (€190.000, 2025-2027), tras una beca de la Fundación Japón (€13.500, 2021-2022). Participo en grupos de investigación financiados nacionalmente (GREGAL sobre circulación de industrias culturales asiáticas, TRAMEVIC sobre memoria visual en Asia Oriental, INDOVIG sobre pedagogía de la violencia de género). Mi trayectoria internacional incluye estancias en cuatro países y colaboraciones con investigadores en tres continentes, manteniendo membresías activas en asociaciones académicas (EASJ, EASLCE, ISSN). A nivel predoctoral, recibí una beca "la Caixa" (€30.000, 2013-2015) para realizar estudios de máster en la Universidad de Leiden.

Mi liderazgo científico se manifiesta de formas diversas. Cofundé en 2012 *Asiademica*, revista de acceso abierto que durante trece años ha ofrecido a jóvenes investigadores su primera experiencia de publicación y mentoría editorial. Sirvo en el consejo editorial de la Revista de Paz y Conflictos y evalúo regularmente para revistas internacionales. He supervisado más de 18 tesis de máster. He presentado más de 35 ponencias en congresos internacionales, incluyendo conferencias magistrales invitadas en Australia y Japón. Mi cartera docente abarca ocho cursos en tres universidades a niveles de grado y máster. He diseñado currículos completos, incluyendo recursos didácticos publicados. Trabajo cómodamente en contextos institucionales diversos y en múltiples idiomas.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Considero esencial que la investigación trascienda los círculos académicos. A parte de docencia universitaria, he impartido cursos sobre arte y crisis climática para público general, para profesorado de secundaria, y sobre lectura crítica. He colaborado con instituciones culturales. como Casa Asia o el Consejo de Cultura de Barcelona y produzco podcasts de divulgación de conocimiento y materiales pedagógicos.

Cuento con acreditación de la ANECA (Contratado Doctor) y de la AQU (Lector).



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: LILLO CASTAÑ, VÍCTOR
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Correo Electrónico: victorlillocastan@gmail.com
Título: Utopian thought, confessional conflict and exile in Early Modern Spain
Resumen de la Memoria:

Research Trajectory:

My research trajectory integrates three areas: (1) utopian studies, (2) the circulation of political and theological ideas between Spain and early colonial Mexico, and (3) confessional conflict and exile in Early Modern Spain. Across these fields, I analyse how texts, norms, and people moved through the Iberian world and shaped its intellectual, legal, religious and cultural dynamics.

My doctoral research consisted on the identification, analysis, and critical edition of the earliest complete vernacular translation of Thomas More's "Utopia", preserved in a unique manuscript in the Royal Palace Library of Madrid. I identified its translator as Vasco de Quiroga, first bishop of Michoacán, showing how he adapted More's political fiction into a legal framework for the pueblos-hospitales he founded in New Spain. Published as a monograph, this research transformed the understanding of "Utopia"’s reception in Early Modern Spain and colonial Mexico and received notable scholarly and media attention.

My second line of research examines the legal, theological, and humanist debates on the Spanish imperial expansion in the Americas. I have focused in particular on the controversies over the enslavement of Indigenous peoples, their evangelisation, and the discursive strategies in humanist and scholastic treatises on the legitimacy of the Spanish conquest of America.

My third area –currently funded by a Marie Skłodowska-Curie Actions CZ Fellowship– focuses on confessional conflict and exile in Early Modern Spain, in particular, in the study of Spanish Protestant expatriates during the sixteenth-century.

Proposed Ramón y Cajal Research Line:

My project offers the first integrated study of exile in Early Modern Spain from a broad, comparative, and methodologically innovative perspective. Although individual exiled groups -specially Jews and Moriscos- have received attention, Spanish Early Modern exile as a historical phenomenon remains underrepresented and fragmented in current scholarship.

This project addresses that gap by analysing both the ethnic, religious, and political groups expelled from the Iberian Peninsula (Jews, Moriscos, Spanish Protestants, and political dissidents) and the foreign communities who sought refuge in Spain during the sixteenth and seventeenth centuries (notably English and Irish Catholics). This dual perspective –Spain as both producer and receiver of exiles– makes it possible to reassess the complex social, cultural, and political dynamics that shaped Early Modern mobility. Its methodology combines archival research, philology, comparative and transnational analysis, microhistory, history of ideas, and digital humanities tools such as GIS mapping and metadata analysis.

The expected outputs include: (1) a scholarly monograph, (2) an international conference on Early Modern exile in Spain and Europe, bringing together experts in the field (3) an edited volume derived from the conference, and (4) a project website with interactive, open-access resources. Building on –but significantly expanding my current MSCA-CZ project–, this research integrates multiple communities and new methodological approaches, establishing a pioneering programme for the study of Early Modern exile.

Resumen del Currículum Vitae:

I obtained my PhD in Spanish Philology at the Universitat Autònoma de Barcelona (Extraordinary Doctoral Prize, 2020) with a dissertation that identified, studied and published the earliest vernacular translation of Thomas More's "Utopia", produced in New Spain by Vasco de Quiroga in the 1530s. This constitutes a major contribution to Early Modern utopian studies and to the intellectual history of colonial Mexico, culminating in a monograph published by the Centro de Estudios Políticos y Constitucionales de España (2021). My doctoral research received wide international press coverage (EuropaPress, La Vanguardia, Publimetro, Infobae, Letras Libres, Historias [INAH]) and has been reviewed in the "Sixteenth Century Journal", "Críticón", "Revista de Estudios Histórico-Jurídicos", and "Estudios de Historia Novohispana".

Beyond this book, I have published articles and book chapters in leading journals and publishers, including "Classiques Garnier", "Moreana (Edinburgh University Press)", "Historia Mexicana", "Hispania Sacra", "Mélanges de la Casa de Velázquez", and the "Bulletin of Hispanic Studies". And I have delivered invited lectures and conference papers in Mexico (UNAM), Argentina (UCA), France (Université Paris Nanterre), Germany (Max Planck Institute for Legal History and Legal Theory), and the Czech Republic (Palacký University Olomouc).

Between 2020 and 2023 I undertook postdoctoral stays for a total of 33 months at the Cusanus Institut (Universität Trier), Ruhr-Universität Bochum, and the Max Planck Institute for Legal History and Legal Theory (Frankfurt am Main), strengthening the interdisciplinary dimension of my work and my understanding of legal and theological debates in the Spanish Americas. My stay at the Max Planck Institute expanded international networks, exemplified by the conference "Normative Knowledge and the Emergence of New Spain" (Frankfurt, January 2025), co-organised with Andrés Íñigo Silva (UNAM) and José Luis Egío (MPIILHT), leading to a Brill volume under preparation.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

In 2025 I was awarded a Marie Skłodowska-Curie Actions-CZ fellowship as Principal Investigator at Palacký University Olomouc with the project "Scars of Exile: Spanish Protestant Expatriates in Early Modern Europe", (€185,000, EU-Czech Government), establishing my new research line on confessional conflict and exile in Early Modern Spain.

Alongside my research, I have developed a record of academic leadership and knowledge transfer activities: coordinating a monographic issue in "Manuscripts. Revista d'Història Moderna" (2020), managing the podcast project "1521. The Reformation and the Catholic Book" (2021-2023), serving on the academic board of the exhibition "Malos libros. La censura en la España moderna", directed by María José Vega (Biblioteca Nacional de España, 2023-2024), and reviewing for several international journals: "Historia" (Pontificia Universidad Católica de Chile), "SEDERI", "Libros de la Corte", "Studia Aurea", "Stultifera", "Religio" (Masaryk University Brno), and "REUTOPIA".

Overall, my trajectory combines substantial international mobility, proven independence through a competitively funded project as PI, a coherent and innovative research agenda, and sustained contributions to Early Modern Hispanic intellectual history.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: PALACIOS GONZÁLEZ, DANIEL
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Título: Prácticas y políticas artísticas contemporáneas de memoria y representación

Resumen de la Memoria:

Mi trayectoria y línea de investigación han abordado las prácticas y políticas artísticas contemporáneas de memoria y representación. Partiendo de mi formación como historiador del arte preocupado por la producción cultural comunitaria, diseñé el proyecto que me permitió obtener un contrato doctoral Marie Curie en la Universidad de Colonia. Me convertí en uno de los pocos historiadores del arte que estudiaban los monumentos y memoriales contemporáneos construidos en torno a las fosas comunes de la Guerra Civil española. Combiné historia del arte, trabajo de campo y humanidades digitales, lo que culminó en una base de datos con más de 600 monumentos en toda España. Esta investigación pionera incluyó entrevistas y visitas a más de 100 lugares de memoria, lo que demostró cómo las comunidades locales crean artísticamente y artesanalmente sus espacios de memoria. También realicé actividades de transferencia de conocimiento en esta línea, tales como asesorar a la Plataforma de Asociaciones de Familiares de Víctimas del Franquismo de las Fosas de Paterna, o colaborar con artistas en las exposiciones IP30. Memoria de la desaparición (Valencia, 2022) y La plenarem de flors (Alzira, 2025). Esta investigación sobre las memorias culturales de las víctimas fue complementada con un nuevo proyecto que propuse y dirigí junto a Yayo Aznar sobre la cultura visual producida por los maquis españoles: fotografías, ilustraciones, monumentos, financiado por el Ministerio de Políticas Territoriales y Memoria Democrática (183 MD 2024). Mi ciclo de trabajo sobre la memoria de la guerra, la dictadura, la transición y la democracia en España fue complementado por una nueva línea de investigación de carácter internacional. Durante mi etapa posdoctoral en Birkbeck, Universidad de Londres, decidí abordar la propia noción contemporánea de monumento. Realicé una exhaustiva investigación bibliográfica y teórica para reformular nuestra comprensión del término en archivos y bibliotecas de Londres. Esto me llevó a redactar la definición de "Monument" para Palgrave-Springer-Nature, y editar, con José M^a Durán, el volumen Redefining Monuments (Palgrave, 2025), así como a escribir un nuevo libro de divulgación para una audiencia general, ¿Quién tiene derecho al monumento? (Katakarak, 2025). Todo en el marco del proyecto que dirigí como IP, ANTIMON. Redefiniciones transnacionales de la práctica (Anti)Monumental (PFGH10/2025). Tras obtener resultados de impacto en relación con la producción, la intervención artística y la destrucción de monumentos, actualmente estoy concluyendo ese ciclo de investigación trabajando no sólo en sus conflictos ideológicos contemporáneos, sino también en su uso económico como activos turísticos, con una nueva monografía en preparación. Con ello, mi objetivo es cerrar este ciclo de investigación al finalizar mi contrato actual e iniciar una nueva línea de investigación moviéndome de lo monumental a su antítesis formal. Planteo continuar trabajando sobre la artesanía como práctica contemporánea vista como un proceso de "pensamiento artesanal" en lugar de como tradición u objeto histórico. El "pensamiento artesanal" puede servir como forma de emancipación y creatividad frente al trabajo alineado artístico, en un contexto de constante desdibujamiento del saber manual material en las artes postconceptuales y en la era de la Inteligencia Artificial.

Resumen del Currículum Vitae:

Soy historiador del arte especializado en prácticas memoriales contemporáneas. He publicado 4 monografías, editado 3 libros, 21 artículos en revistas académicas con revisión por pares, 10 capítulos de libro y he presentado 26 ponencias en congresos y seminarios. Además, cuento con más de 200 horas de experiencia docente en asignaturas de historia del arte contemporáneo. Tras completar mis estudios de historia del arte en España y Chile, obtuve dos títulos de posgrado: uno en gestión cultural en Serbia y Francia, en el marco de una Cátedra UNESCO, y otro en desarrollo cultural comunitario en Cuba como becario de posgrado de Mutua Madrileña. Con esta formación teórica humanística y con métodos de investigación empíricos, continué mi carrera investigadora como Marie Curie Research Fellow en Colonia, estudiando los monumentos y las políticas de memoria de la Guerra Civil española. Mi trabajo combinó humanidades digitales con trabajo de campo, dando lugar a una base de datos con más de 600 monumentos en España que demuestra cómo las comunidades locales han construido sus propios monumentos y lugares de memoria. Los resultados de esta investigación se publicaron en el libro De fosas comunes a lugares de memoria (CEPC, 2022), que recibió el First Book Award de la Memory Studies Association en 2023. Una edición revisada de ese trabajo es el libro Making Monuments from Mass Graves in Contemporary Spain, publicado por Amsterdam University Press. También he presentado mis resultados en distintas partes de España y colaborado con diversas ONGs y artistas, con resultados notables como las exposiciones IP30. Memòria de la desaparició. Habitar l'oblit, Compartir la memòria, multiplicar els relats y La plenarem de flors en Valencia. Proseguí mi carrera internacional como investigador posdoctoral en el Birkbeck College, University of London, donde realicé un salto cualitativo en mi investigación: teorizar la idea de la memoria y la producción y destrucción contemporáneas de monumentos. Entre otros resultados, redacté la definición de "Monument" para la Palgrave Encyclopaedia, edité un número especial en la revista Huarte de San Juan, y edité el libro Redefining Monuments con Palgrave, que incluye el trabajo de más de 10 artistas e investigadores internacionales, entre ellos miembros de mi propio proyecto como IP, ANTIMON, financiado por la UNED, lo que demuestra mi liderazgo en el campo. Asimismo, escribí junto a José María Durán un nuevo libro adaptando mi investigación a públicos no académicos: ¿Quién tiene derecho al monumento?, publicado bajo licencia Creative Commons por Katakarak. Actualmente soy IP junto con Yayo Aznar Almazán en un proyecto de investigación sobre la cultura visual de los maquis franceses y españoles, financiado por el Ministerio de Políticas Territoriales y Memoria Democrática. El proyecto incluye trabajo de campo, investigación en archivos y digitalización de fotografías, documentos y monumentos, con el resultado de una nueva monografía publicada por Sans Soleil. Además, he formado parte de proyectos internacionales de investigación en la UAM, el CSIC y la Universitat de Barcelona, así como de grupos de investigación en la Université Bordeaux Montaigne, la UNED y la UAM.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Cultura: filología, literatura y arte

Nombre:

HILBORN, MATTHEW

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RYC2025-055003-I

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Título:

A Cartography of Humour and Affect: Gender, Nation, and Romance in Spanish and World Cinemas

Resumen de la Memoria:

My research trajectory demonstrates a coherent and award-winning intellectual journey from analysing humour as a vehicle for national identity to critiquing its role in shaping contemporary bodily and masculine anxieties. My career, supported by prestigious fellowships including an AHRC Northern Bridge Doctoral Scholarship (£80,000) and a Government of Ireland Postdoctoral Fellowship (€112,986.50), is defined by interrogating how popular genres negotiate complex sociocultural tensions.

My foundational research, culminating in the monograph *Film Comedy and Spain* (Legenda/Modern Humanities Research Association, 2024; AHGBI Publication Prize), established my expertise in decoding how Spanish comedy from 1970-2020 mediated post-dictatorship national identity. This work proved my ability to use humour theory to dissect how laughter consolidates and subverts collective identities during periods of political crisis, analysing over 50 years of cinematic history. Elsewhere, I have translated, edited, and co-written the Introduction to *Ophelia Through Time: Reimaginings in Art and Film* (Cambridge Scholars, 2025), and have signed a third book contract with Bloomsbury for a forthcoming monograph *From Spain With Love: The Spanish Romantic Comedy post-2000*.

This focus was strategically expanded during my postdoctoral, co-founder role on the AHRC project "Screen Encounters with Britain" (£452,623), where I led the 'Markets' analysis across four European countries. Here, I applied my understanding of cultural specificity to a transnational context, co-authoring five peer-reviewed journal articles and a forthcoming chapter in *Public Service Media* (Nordicom). By administering surveys to thousands of young Europeans and conducting 30+ interviews, I gathered and examined robust data on how cultural values, including humour and language, drive the reception of screen content, directly engaging with theories of 'soft power' and transnational streaming flows.

My proposed research on baldness in screen media is the direct synthesis of this trajectory. It leverages my foundational expertise in humour studies (from analysing masculinities in Spanish film comedy from Alfredo Landa to José Luis López Vázquez to Torrente, to 'grey humour' in post-war literature), my command of gender and representation (evident in my forthcoming work on age-gap rom-coms [Screen], and hybrid intimacies in *Smiley* [International Journal of Iberian Studies]), and my methodological skill in transnational media analysis. His article "Grey Humour" (2022) in the *Bulletin of Spanish Studies* already pioneered theories of "feel-bad" comedy, a concept directly applicable to the stigmatising laughter surrounding baldness. My 2025 article in *NECSUS*, on the costs and comedy of baldness, demonstrates my existing pivot toward this topic.

This project is therefore a sophisticated convergence of my established lines of inquiry. It applies his proven analytical framework – using genre, humour, and narrative to deconstruct identity – to a pervasive yet critically neglected site of masculine crisis. By examining how the bald male body is framed as hypermasculine, villainous, or laughable across global screen media, I bring my full scholarly arsenal to bear, promising a pathbreaking contribution to film studies, masculinity studies, and the critical understanding of embodied stigma in the digital age.

Resumen del Currículum Vitae:

I am an accomplished scholar whose international research career interrogates the intersections of popular culture, national identity, and contemporary societal anxieties across European screen media. Following a BA and MA at Oxford University I earned my PhD in Spanish Film Studies from Durham University (2021), supported by a prestigious AHRC Northern Bridge Scholarship worth >£80,000. My doctoral research on humour in Spanish cinema laid the groundwork for his first monograph, *Film Comedy and Spain*, which was awarded the 2024 Publication Prize of the Association of Hispanists of Great Britain and Ireland.

Following my doctorate, my research trajectory expanded significantly through a Postdoctoral Research Associate position at King's College London (2021-2023). On the AHRC-funded project "Screen Encounters with Britain" (£452,623), I led the "Markets" work package, designing eight surveys, conducting over 30 interviews, and co-authoring five journal articles and a chapter in *Public Service Media* (Nordicom). This role cemented my expertise in transnational media circulation and soft power in a post-Brexit context. In 2024, I was awarded a Government of Ireland Postdoctoral Research Fellowship (€112,986.50) at University College Dublin. My current project challenges critical deprecations of the romantic comedy to examine how Spanish films and series on streaming platforms reshape conceptions of gender, sexuality, and nationhood.

I have cultivated a substantial and impactful publication record: I have authored a 400-page monograph, translated, edited, and co-written chapters in another monograph, and published journal articles in leading peer-reviewed outlets such as *NECSUS* and *Bulletin of Spanish Visual Studies*. My prolific output includes six forthcoming journal articles (e.g., in *Screen*, *International Journal of Iberian Studies*) and two forthcoming book chapters with major presses like Palgrave, demonstrating a consistent and rising trajectory of high-quality research. My work consistently bridges film studies, cultural studies, and gender studies, addressing both academic and broader public audiences.

My teaching portfolio is equally robust, encompassing over 100 hours of course design and delivery across four universities. At University College Dublin, I serve as Occasional Lecturer, leading modules on Spanish film and crisis, and I have co-created a new MA module (January 2026) on European Comedy. I further extended his public engagement by writing and delivering a four-lecture series on Spanish cinema for the Instituto Cervantes London, two invited lectures at Instituto Cervantes Dublin. My research-led teaching has directly shaped the learning of hundreds of undergraduates and postgraduates.

Beyond research and teaching, I demonstrates significant university-wide, interdisciplinary leadership. He founded and co-organised the Spotting Red Flags: Toxic Screen Romance Symposium at King's College London, securing £1,704 in competitive funding. As Senior Education Programmes Officer at The English-Speaking Union, I managed a team of three and developed programmes that enhanced the oracy skills of over 10,000 young people in



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

the UK and reached more than 1,000,000 students across 50+ countries. I currently serve as the Postdoctoral Representative on the College of Arts & Humanities Research Committee at UCD.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Cultura: filología, literatura y arte

Nombre:

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Título:

Hispanic Theatre in Performance: production, imaginaries, circuits, and circulation

Resumen de la Memoria:

After completing my PhD on Celestina's performance history in Spain, the four postdoctoral contracts I held—three as PI and two abroad—were decisive in shaping my international profile and opening new research fields. My Andreazza Fellowship at the Cini Foundation (Venice, 2017) advanced my work on the 20th- and 21st-century performance of Golden Age classics and initiated a new line of inquiry into Celestina's stage life in Italy and the role of classical texts in European cultural exchange. This work led to an article on Celestina's circulation in Italy during the Second World War and to my forthcoming monograph *Performing "Celestina" on the Italian Stage* (Routledge).

As a Juan de la Cierva Fellow at Carlos III University (2018–2019) I joined the international research group PERFORMA, opening a second line of work on contemporary Spanish performing arts. This includes my studies on La Ribot—such as my chapter in *On Spectatorship* (Peter Lang, 2024)—and my co-edited volume *Contra el espectador* (Dykinson, 2025), for which I wrote the introduction. I expanded this field transatlantically through my critical edition and co-translation of Messiez's *Los ojos*, whose introduction proposes a new framework for analysing cross-pollination between Argentinian and Spanish theatre. Within PERFORMA I organised two international conferences.

My Marie Curie Individual Fellowship at the University of Leeds (2019–2021) further strengthened the international dimension of my work. As PI of the project EStages.UK I mapped the circulation of Spanish theatre in the UK, developed educational materials for British schools and collaborated with the Cervantes Theatre in London. This resulted in my first publication on cultural policy (*International Journal of Cultural Policy*). Lorca's reception in Britain became central to this project: I uncovered previously unknown productions from 1938–1956, presented my findings at the University of Oxford, published an article in *Studies in Theatre and Performance* and in a commissioned chapter for *Legenda*. During this period I received multiple invitations to speak at national and international institutions, co-directed *International Writers* at Leeds and collaborated with the Cervantes, Lull and Camões Institutes.

My current Atracción de Talento 1 project at the Complutense University, *García Lorca en los Escenarios de Europa (1936–1960)*, examines the cultural networks behind Lorca's earliest European performances. As PI I lead a postdoctoral researcher reconstructing Lorca's productions in eight EU countries between his death and the reintroduction of his theatre to Spanish stages. This project has broadened my engagement with historical research, including an article on La Barraca's legacy to women's history for *Contemporary European History* (U. of Cambridge). In collaboration with the Centre for Ibsen Studies, I am currently building a database on Lorca's theatre productions for the Centro García Lorca. I have been invited as Visiting Researcher to Paris 8 (2024), Paderborn University (2025) and the University of Oslo (2024). Since 2025 I also co-lead a team of six researchers as co-PI of the Seminario de Estudios Teatrales within the CONSTEMAD funded consortium, further reinforcing my line of work in cultural policy and cultural management.

Resumen del Currículum Vitae:

I have taught and conducted research in Spain, the UK, the USA and Italy, securing €841,604 in highly competitive international (Marie Curie IF, Cini Foundation) and national (Talento 1 CAM, Juan de la Cierva, FPU) fellowships. I have been PI in four national and international projects. My ability to work collaboratively is reflected in regular invitations to act as CI (7) and as joint-PI, leading a team of 6 researchers within CONSTEMAD. I have also obtained funding for research stays and translations (Ministry of Education, Ministry of Culture, i-Portunus EU).

My publications include a single-authored monograph (top predicted grade and counted as two books by the UK REF), three co-edited volumes, two special issues, twelve peer-reviewed articles in English and Spanish (3 Q1, 3 Q2, mostly open access), nine book chapters and five editions and translations for major publishers. My first (Peter Lang) and forthcoming (Routledge) monographs analyse how Celestina has been used in the 20th and 21st centuries to construct counter-hegemonic identities in Spain and Italy. My co-edited volume *Diálogos en las tablas* (Reichenberger) has received 9 excellent reviews. My work on Celestina now also addresses visual culture, with a co-edited volume (*Imagining Celestina*, Reichenberger, 2025). In contemporary theatre, my critical edition of Messiez's *Los ojos* (MHRA/Cambridge) examines the influence of Argentina's independent cooperative model on Spanish theatre. As part of my work on Lorca's legacy, Methuen/Bloomsbury has commissioned a new English edition of *Yerma* under contract.

As a translator, I co-published an acclaimed annotated anthology of Pasolini's poems (*Ultramarinos*, 2022). I have participated in twenty international conferences (twelve invited) and delivered eleven invited talks at leading institutions such as the University of Oxford and the Accademia dei Lincei. I have organised six international conferences and seminars.

I have a strong record of contributions to society and collaboration with the public and private sectors in Spain and the UK. As a FormARTE Fellow I produced reports for the Ministry of Culture and I am developing a database of international productions of Lorca's theatre for the Centro García Lorca of Granada (in collaboration with the University of Oslo). I co-curated an exhibition on the visual culture of Celestina for the Museo Celestina, which will travel to the Taylorian Library (Oxford) in 2026. At EU level, I am a core member of UNA Europa's Creative and Cultural Industries section. Since 2023 I co-direct an annual Lorca Study Day for the British Film Institute. I have advised and produce educational materials for theatre and dance companies such as the Cervantes Theatre (London).

My training of young researchers includes leading one postdoctoral and two PhD researchers, supervising seven MA dissertations (five completed) and serving on four PhD panels.

Regarding evaluation and editorial activities, I served as Expert Evaluator for the 2022 Marie Curie PF (European Commission). I am editor-in-chief of the journal *Pygmalion*, on the editorial boards of two journals, and reviewer for Peter Lang and eleven journals. I hold the R3 Certificate (AEI) as an



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

established independent researcher. My report for the Ministry of Culture also informed the design of the CARTEMAD project and the platform teatrero.com, patent M4000840



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Cultura: filología, literatura y arte

Nombre:

CAMPANELLA CASAS, LUCIA

Referencia:

RYC2025-056805-I

Correo Electrónico:

lcampanella@uoc.edu

Título:

Radical Literature and Women in Motion: Translation, Circulation, and Transnational Cultural Spaces

Resumen de la Memoria:

My research trajectory has brought together Translation Studies, Comparative Literature, Digital Humanities, and Transnational Cultural History through three interconnected research lines.

First, in "Translation and Soft Power: Anarchist Periodicals through Large-Scale Data Analysis," I have developed a groundbreaking approach to anarchist print culture by combining the concept of soft power with the large-scale study of translations published in periodicals between 1890 and 1910. Drawing on world literature debates, I introduced the concept of an "anarchist argot" to describe flexible, multilingual exchanges shaped by piracy, adaptation, and informal networks. My work has highlighted the central role of translators—particularly women—and traced the transnational circulation of literary authors. The Marie Skłodowska-Curie project Argot analysed periodicals in six languages across five cities, demonstrating the value of digital and large-scale approaches to radical intellectual networks.

Second, with the line on "Latin American Digital Translation History: Libraries and the Translator's Archives," I have contributed significantly to Latin American digital translation history by introducing data-driven approaches into Southern Cone scholarship, pioneering work on translators' archives, and leading research on the internationalization of Ibero-American literature. I co-designed the first large-scale study of literary translation in Uruguay, collaborated with digital and archival scholars, and examined translators' archives. I am also carrying out a comparative study of translation support programs across ten Ibero-American countries, demonstrating the centrality of data-driven methods in regions where digital humanities training remains limited.

The third line, "Comparative Literature: Transnational Women Workers in Literature and the Arts," explores working women as fictional subjects and cultural producers. I have examined the political agency of anarchist women engaged in publishing and translation, and analysed representations of women workers across Western and Latin American literatures and visual arts. My research on the transnational figure of the housemaid, offers the first *longue durée* comparative study of domestic servants as a central figure of modernity and illuminates broader dynamics of class, gender, and labour. Awarded an Erasmus Mundus Interzones scholarship, this line opens new perspectives in literary, cultural, and labour history.

The line of research I'm proposing to pursue in the following years, "Radical Nodes: Publishing Houses as Soft Power Agents in the Spanish-Speaking World (1890-1975)," builds on my expertise in translation, soft power, and digital Latin American translation history. RadicalNodes examines independent publishing houses as key agents in the dissemination of translated radical ideas across the Spanish-speaking world. Considering publishers as nodes of soft power, it investigates the creation, circulation, and afterlife of political books through book history, archival research and computational methods. RadicalNodes will reconstruct a transnational corpus of radical translations, reassess the role of editors and translators (especially women), and map the circuits that shaped a shared radical cultural space from the first globalization wave to the political transitions of the 1970s.

Resumen del Currículum Vitae:

Lucía Campanella is an interdisciplinary researcher in comparative literature, translation studies, and digital humanities, and a former Marie Skłodowska-Curie Postdoctoral Fellow. Her work integrates transnational, gendered, and data-driven approaches to intellectual and cultural history. She has advanced the study of literary circulation in the transatlantic anarchist press, strengthened Latin American digital translation history through large-scale analyses of historical and contemporary literary translations, and examined women workers as cultural agents and as fictional figures.

Her work is organized around three research lines, disseminated through top-ranked open-access journals, edited volumes, and multilingual public-facing outputs. The first line, Translation and Soft Power, has produced multiple articles, book chapters, a special issue (Perspectives), a dataset, an open-access edited book, two forthcoming monographs, a public exhibition and catalogue, two international conferences, public talks, and a podcast. It has secured €165,312.96 in competitive funding through a Marie Skłodowska-Curie Postdoctoral Fellowship and additional grants for publishing and events. The second line, Latin American Digital Translation History, has generated a dataset, a user-friendly app, several co-authored and single-authored studies, and presentations at international conferences, including FIL Guadalajara 2025. It has received a €29,000 R&D grant (CSIC-Universidad de la República, Uruguay) for the HTLU group and a €120,800 PID grant (AEI-Ministerio de Ciencia, Innovación y Universidades, Spain) for the GlobaLS group. The third line, Transnational Women Workers in Literature and the Arts, led to a doctoral dissertation, a collective book, a symposium, and invited talks. This research was supported by a €60,000 Erasmus Mundus doctoral grant.

She has strong scientific and technical skills, including extensive archival experience and expertise in digital humanities tools such as data mining, AI-enhanced text recognition, and NLP for computer-assisted analysis. She is committed to open science, producing FAIR-compliant databases and open-access publications. She combines close and distant reading, and macro- and micro-historical methods. She has led entire research projects and work packages, reinforcing her capacity to coordinate archival, data-driven, and international collaborative work.

Her research generates social impact through technological development, knowledge transfer, and partnerships with non-academic stakeholders such as the Uruguayan National Library, Fundación Anselmo Lorenzo, Ajuntament de Barcelona, Institut Ramon Llull, and CERALC. She has published



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

curated datasets, developed a public app that expands access to translation history, and co-organized an exhibition highlighting women's political engagement in anarchist publishing.

She mentors PhD students (currently supervising three doctoral theses), teaches courses in comparative literature and research methods, and supports doctoral career development through guidance on publishing, internationalization, and skills acquisition. She also contributes to editorial work, peer review, and the coordination of established and emerging research groups such as GlobalS and HTLU, participating in projects such as ARGOT, TradDivers, and 150 años de traducción en Uruguay.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: ESPINO BARRERA, TOMÁS
Referencia: RYC2025-057216-I
Correo Electrónico: tespinob@gmail.com
Título: Multilingüismo literario, literatura mundial e intertextualidad

Resumen de la Memoria:

I hold a PhD in Comparative Literature from the U. of Granada and I am currently a MSCA COFUND postdoctoral fellow at the U. of Luxembourg. I have been awarded five postdoctoral fellowships, including highly-competitive regional (Junta de Andalucía PAIDI), national (Juan de la Cierva Formación), and international programs (MSCA). My current interests are in migrant and exilic literature, literary multilingualism, intertextuality, digital humanities and world literature.

Barbarisms and loanwords have long been the objects of highly charged linguistic, political, and aesthetic discourses in Europe (Yildiz 2012: 67), triggering either the enthusiastic embrace of fashionable foreign words or the reaction of widely-publicized campaigns of linguistic purism. These debates often rely on a vocabulary of either assimilation and integration or banishment and implied extermination, a kind of normative narrative which echoes (or struggles against) the mainstream discourses on migration and cohabitation of different communities within the same territory.

The present project is concerned not so much with the study of the individual trajectories of any loanwords in particular, with a history of words of foreign origin in any given language or with the general dynamics of lexical borrowings in contact linguistics. Rather, it will try to unearth the common normative framework which presides the perception of words of foreign origin as migrants and exiles in rhetoric, linguistics, and literature. The embodiment of words of foreign origin as migrants becomes a figure of the perceived internal instability in the conceptual constellations of community, language, citizenship, proper literary style, and the uneasy relationship with the foreign Other. As Stockhammer puts it, migration and integration policy are a key part of grammar (2014: 318, my translation).

Drawing from our previous experience in multilingual and exilic literature scholarship, the Wanderwords project will investigate how a series of ideological representations of language are embodied in different metaphors of words of foreign origin as migrants or exiles. In so doing, our project will investigate how the legal norms which regulate the presence of aliens in a community and their right to take part in public life are transplanted into the domains of language planning, rhetoric, and literary criticism, and how, in turn, discourses on linguistic prescriptivism may inform changes in migrant and citizenship law. This project will chiefly pursue (but is not restricted to) three major historical strands of the representation of words of foreign origin as migrants: ancient rhetoric, early modern discourses on the national language and the body politic and nineteenth-century and twentieth-century purist campaigns in literature and culture.

The present project seeks to explore the changing ways in which the critique and representation of words of foreign origin reflect and defy the changing conditions of migration, assimilation, and exile policies throughout history. In so doing, this historically oriented project will engage with current debates on language policy, citizenship, multilingual literature and mobility on a global scale. More than ever, language is at the centre of the debate on cultural identity, migration, and displacement.

Resumen del Currículum Vitae:

My main line of work has been concerned with the representation of multilingualism and the loss of the mother tongue in exilic literature from a comparative perspective, with special attention to texts and periods which have remained relatively unexplored by the traditional scholarship on literary multilingualism. I have explored the conflictive narratives of multilingualism and language loss in exilic literature by focusing on the imaginaries which have surrounded the mother tongue and foreign languages throughout history. The attention to previous eras and different locales has allowed me to trace alternative literary representations of language before the national and beyond the globalized postnational, thus questioning and historicizing modern, ideologically-laden conceptions of language boundaries, the mother tongue, multilingualism, and language loss by paying attention to their political, philosophical or religious resonances in different times and places. In addition, my focus on the literary representation of language attrition (the non-pathological decrease in an individual of a previously acquired language) has allowed me to open a new subfield of research within the emerging field of literary multilingualism studies and establish pioneering connections with the medical humanities. My current line of work explores epigraphs (short quotations at the beginning of a book or chapter) from a theoretical, computational, and comparative perspective. The mixed approach of intertextual and paratextual theory, distant reading of a large multilingual corpus of European novels via network analysis and digital mapping, and a selection of significant case studies shall try to shed light on the potential of literary epigraphs as mechanisms of influence, circulation, and translation within and beyond national borders. This is the first project dedicated to epigraphs from a comparative digital humanities perspective. Other lines of work in emerging interdisciplinary fields include the exploration of the representation of double bilingual selves via self-translation, and the interface between literature, space, memory and the history of emotions.

My research (over twenty papers) has been published (in Spanish, English and German) in highly-ranked journals (such as RILCE, Comparative Critical Studies, Interlitteraria and Letral) and publishers (such as Peter Lang, Brill, De Gruyter and John Benjamins). In addition, I have co-edited a volume at UCL Press and a forthcoming volume at Palgrave. My first monograph is under contract at Comares.

I have been awarded several highly competitive fellowships, including a FPU doctoral fellowship and Juan de la Cierva Formación, Junta de Andalucía PAIDI and MSCA COFUND postdoctoral fellowships. I have co-lead one short project at the University of Granada on the intersection between self-writing, multilingualism and gender identity and I currently lead the project EPIMAPS on the study of epigraphs in the European novel.

I have obtained funding for five research stays (QMUL London, LMU Munich, University of Luxembourg, Centre Marc Bloch Berlin, Universität Innsbruck; 11 months in total). I am a member of the COST Action "Literary multilingualism and social transformations in superdiverse societies". I have supervised three M.A. theses and

I am currently a member of the supervision committee of a PhD student.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: PEIRANO OLATE, MARÍA PAZ
Referencia: RYC2025-055512-I
Correo Electrónico: mppeirano@uchile.cl
Título: Building Bridges Between Europe and Latin America: A Research Trajectory in Transnational Film Cultures, Film Audiences and International Circulation

Resumen de la Memoria:

Throughout my career, I have developed a distinctive and internationally recognised research profile on cinema as a sociocultural practice, particularly within under-studied Ibero-American contexts and their global connections. My work offers original contributions to film studies, visual anthropology, and cultural history by advancing new perspectives on film festivals, cultural mediation, film circulation, and audience development through an integrated ethnographic, qualitative, and archival approach.

My proposed research line builds upon my long-standing work on Latin American cinema and film cultures, particularly in Chile, and marks a significant expansion in historical depth, geographical scope, and analytical focus. Since completing my PhD in Social Anthropology, I have developed an independent and innovative research agenda that integrates an interdisciplinary perspective to study local film cultures from a Global South perspective.

My previous experience as Principal Investigator of highly competitive, nationally and internationally funded research projects includes the first systematic mapping of Chilean film festivals, pioneering analyses of festivals, film education, and cinephilia, as well as the first systematic recovery and analysis of Chilean film audiences' experiences and cinemagoing practices. These studies are based on interdisciplinary research and have consistently emphasised the importance of cultural mediation, institutions and cinemagoing experiences in shaping film cultures and international circulation. More recently, my MSCA Fellowship has allowed me to advance in the study of cinema and Cold War cultural diplomacy, contributing new empirical evidence to the emergent field of film culture and international relations by analysing European-Latin American cinematic exchanges, circulation dynamics, and the impact of cultural policies on global film flows.

The proposed line of research is "European Cinema in the Southern Cone: Circulation, Diplomacy, and Cultural Reception", and extends this agenda by examining the transnational circulation of European cinema in Chile, Argentina, and Uruguay between 1950 and 1990. It focuses on how European films were promoted, distributed, and received in these countries during key moments of political transformation, examining the role of cultural diplomacy and film as a form of soft power in Cold War contexts. Particular attention is given to the actions of national and supranational cultural institutions—such as UNIFRANCE, UNITALIA, UNIESPAÑA, Inter-Nations, the British Council, and UNESCO—and how their agendas intersected with local exhibition networks, cinephile communities, and institutional actors.

This research line consolidates my previous expertise while opening new avenues in cultural diplomacy and historical film circulation studies. It contributes original insights to global film history and cultural studies, and reinforces Spain's strategic role as a hub for Euro-Latin American cultural research. It also promotes an inclusive and internationally engaged research agenda, enhancing the visibility of Global South perspectives within the humanities.

Resumen del Currículum Vitae:

María Paz Peirano is a MSCA Postdoctoral Fellow (2024-2025) at the University of Antwerp (Belgium), in collaboration with Oxford Brookes University (UK), and holds a PhD in Social Anthropology from the University of Kent (2015). Her interdisciplinary research lies at the intersection of cinema, anthropology, and cultural studies, with a strong ethnographic and historical-cultural approach to cinema as a social practice. She has made significant and original contributions to the study of Latin American cinema and film culture through a transnational and comparative lens. Her research examines underexplored phenomena such as film festivals, audience formation, and the role of cultural diplomacy in film circulation. Peirano is also a pioneer in consolidating the emerging fields of New Cinema History and film festivals in Latin America. Her publications are frequently cited as key references in transnational research on small and "peripheral" cinemas, contributing to the growing visibility of Global South film scholarship in international academia. Her work has been widely disseminated through high-quality and multilingual international journals, books, book chapters, and conferences across Latin America, Europe, and the US. She has developed international collaborations with academic institutions in Europe, Latin America and the U.S, strengthening the global relevance of her research. She has led four competitive research projects as Principal Investigator (MINCAP 4402-4 and 410942; Fondecyt 11160735 and 1211594), and her current MSCA fellowship (Horizon Europe) on European cultural diplomacy and cinema in Chile. These projects demonstrate a sustained capacity to generate novel research ideas, secure funding, leading and managing interdisciplinary research teams, and deliver innovative results that contribute to international knowledge production. Peirano has also contributed actively to society through public engagement and knowledge-transfer work. She has collaborated with the Chilean Ministry of Culture, museums, film festivals, cultural and audiovisual institutions, serving as an advisor, juror, and consultant. She is the curator of the major exhibition "Cine in Chile: Historia(s) en Movimiento" (Santiago de Chile, 2026), created www.festivalesdecine.cl (the first public mapping of Chilean film festivals), and co-developed the outreach heritage project www.nuestroscinesyanoestán.cl. These platforms are examples of how her research reaches diverse audiences and supports cultural democratization and preservation. As a faculty member at the University of Chile (2016-2023) and Postdoctoral Fellow at University of Leiden and UAntwerpen, she has contributed significantly to academic training and mentoring. She has taught undergraduate and postgraduate courses and supervised and examine MA and PhD theses. She has also contributed to institutional and national research evaluation processes, serving as reviewer for national (ANID) and international agencies (SSHRC Canada) and as a peer reviewer and guest editor for several journals. María Paz Peirano's career stands out for her ability to generate critical, original, and socially engaged knowledge, combining academic rigour with societal impact, international collaboration, and intellectual leadership.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Derecho
Nombre: CASTILLO ORTIZ, PABLO JOSÉ
Referencia: RYC2025-055263-I
Correo Electrónico: pablo_canorivas@hotmail.com
Título: Constitutionalism, authoritarianism and Euroscepticism

Resumen de la Memoria:

I am an international and interdisciplinary scholar whose research examines how constitutional institutions shape democracy, the rule of law, and processes of European integration. Trained in both law and political science (PhD, Universidad Autónoma de Madrid), my work bridges doctrinal, theoretical, and empirical approaches, offering an innovative model of socio-legal scholarship. From the outset of my career, I have sought to generate rigorous empirical evidence in fields traditionally dominated by conceptual and normative analysis. This has involved studying how constitutional courts influence public perceptions of judicial fairness and legitimacy; how judicial councils and other bodies of judicial governance enhance or undermine democratic quality; and how constitutional structures mediate political contestation in the EU.

Methodologically, my work is at the forefront of empirical legal research. I was an early pioneer in applying Qualitative Comparative Analysis (QCA) to legal and constitutional questions, co-authoring one of the most widely used Spanish language textbooks in the field. My research combines QCA with doctrinal analysis, case studies, and mixed-method designs, enabling me to uncover causal patterns that remain invisible to traditional legal scholarship. This interdisciplinary orientation has led me to publish in leading journals in both law and political science, reaching diverse scholarly communities.

My trajectory illustrates a sustained commitment to high-impact research. My PhD received two institutional distinctions and was subsequently published by Routledge. Since then, I have authored several works that advance a comparative and empirically grounded understanding of constitutional governance. My 2023 monograph with Springer examined judicial governance and democratic quality across 46 European countries, offering a comprehensive and original perspective that has attracted the attention of policymakers including the European Network of Councils for the Judiciary and the Chilean Ministry of Justice. My forthcoming co-authored book with Oxford University Press (under contract, forthcoming 2026) analyses constitutionalism and Euroscepticism, further consolidating my standing in European public law.

My work has developed strong international resonance. Research outputs have been cited in amicus curiae briefings before the European Court of Human Rights and the Mexican Supreme Court, and by actors such as the UN Special Rapporteur on the Independence of Judges, the Chancellor of Justice of Finland, and major NGOs in Europe. I have also contributed expert analysis to think tanks such as the European Democracy Hub and Real Instituto Elcano.

I am a Senior Lecturer in Law at the University of Sheffield, and currently I am also a Mercator Fellow at the Jacques Delors Centre (Hertie School, Berlin) within a large DFG/SNSF-funded consortium. I have previously held visiting positions at Sciences Po Paris, the Institute of Advanced Legal Studies, and iCourts at the University of Copenhagen. This international experience informs a research agenda committed to reinforcing democratic resilience through rigorous, interdisciplinary analysis of constitutional institutions.

Resumen del Currículum Vitae:

My academic trajectory combines a sustained commitment to high-quality research, international collaboration, and meaningful public engagement in the fields of constitutional law, politics and European integration. Even before completing my PhD in Law and Political Science at the Universidad Autónoma de Madrid—funded by the Spanish Consejo Superior de Investigaciones Científicas (CSIC)—I joined the University of Sheffield in 2013. Over more than a decade at this global top-100 university, I progressed from Lecturer to Senior Lecturer in Law, developing a research profile that is both interdisciplinary and internationally recognised.

My publication record reflects this trajectory. I am the author or co-author of 45 scholarly outputs, including 18 articles in JCR-indexed journals such as European Constitutional Law Review, European Political Science Review, and Law & Philosophy. I have written three books: my doctoral dissertation (Routledge, 2016); a widely cited co-authored textbook on Qualitative Comparative Analysis in Spanish language (Centro de Investigaciones Sociológicas, 2017); and a 2023 brief monograph with Springer that analyses judicial governance and democratic quality across 46 European countries. A fourth book, co-authored and under contract with Oxford University Press, is expected in 2026. My work has attracted more than 560 citations on Google Scholar, demonstrating its influence across law, political science, and comparative constitutional studies.

Throughout my career I have actively sought opportunities to collaborate across borders and disciplines. I am currently a Mercator Fellow at the Jacques Delors Centre (Hertie School, Berlin), working within the €6 million DFG/SNSF-funded consortium “Reconfiguring Europe.” Beyond this project, I have participated in competitively funded research amounting to over €300,000 and have secured more than £25,000 in individual knowledge-exchange funding from the University of Sheffield, which enabled, among other initiatives, a strategic secondment at the Real Instituto Elcano. I have further strengthened my international networks through visiting positions at Sciences Po Paris, the Institute of Advanced Legal Studies in London, and iCourts at the University of Copenhagen.

My work has also reached institutions operating at the highest levels of constitutional governance. I have presented research to the Chilean Minister of Justice and the Plenary of the Chilean Supreme Court. My work has received additional citations and references by the Helsinki Foundation for Human Rights, Liberty (UK), and I have published with several think tanks which highlight the broader policy relevance of my scholarship.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I am deeply committed to academic service, mentoring, and community building. I have co-supervised two PhD researchers to completion—both now academics in the UK and the Netherlands—and I am currently supervising a third. I have examined five doctoral theses and led the EU Discussion Group at Sheffield, fostering interdisciplinary exchange on European integration. I serve on the International Advisory Board of the Journal of Common Market Studies (Q1 JCR), regularly act as a peer reviewer for leading journals, and have evaluated EU COST Action proposals. My professional activities also include organising conferences and workshops, and frequent media participations.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Derecho

Nombre:

RADOVICH, VIOLETA

Referencia:

RYC2025-054611-I

Correo Electrónico:

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Título:

DERECHO AMBIENTAL DEL MAR Y DEL ESPACIO EXTERIOR

Resumen de la Memoria:

I have been granted three international awards. In 2021, I was awarded a six-month junior fellowship by the University of Bayreuth Centre of International Excellence "Alexander von Humboldt". I worked as a principal investigator in a research project at the University of Bayreuth, Germany focusing on Indigenous Peoples and Local Communities (IPLCs) participation in marine environmental regulation. In 2022, I was awarded the International Climate Protection fellowship by the Alexander von Humboldt Foundation at the Walther Schüking Institute for International Law hosted by Prof. Nele Matz-Luck, and in 2023 I was awarded the Marie Skłodowska-Curie Postdoctoral Fellowship (MSCA) by the European Commission. I have supervised more than 20 Master students and I was appointed external Phd jury of two students. In May 2019, since I was appointed Professor in UNDEF (Universidad Nacional de la Defensa), Escuela de Guerra Naval and thereafter I have been PI of research projects therein granted by national competitive national calls.

Line of research. Abstract: The rapid expansion of satellites, and especially, satellite mega-constellations and the emerging field of mining in outer space increases the risks of collisions, space debris, affects the dark skies and planet Earth's and multiplanetary sustainability. Moreover, the absence of theoretical frameworks and international regulation regarding this reality, which is purely international, leads to space-craft states regulation of the topic at the national level, which generates lack of international control and global inequality. The line of research to be developed, which I call "FROM OCEAN TO SPACE", seeks to address these pressing challenges by pioneering theoretical frameworks for regulating outer space activities informed by ocean governance beyond national jurisdiction. FROM OCEAN TO SPACE chooses to refer to ocean beyond national jurisdiction as Ocean Global Commons (OGC). FROM OCEAN TO SPACE argues that outer space is a global common too as OGC, coins the concept "ocean-space sustainability" and argues that OGC governance shall inform outer space regulation. In this vein, FROM OCEAN TO SPACE proposes to refer to outer space as Space Global Commons (SGC). The main framework underpinning the project is transformative change and transformation governance framework, developed by IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services). This framework bases in three leverage points: reconnecting people to nature, restructuring institutions and rethinking how knowledge is created and used in pursuit of sustainability. By critically analysing OGC governance and by applying the process-tracing, discourse and network analysis, the participant observant method, comparative case studies, multi-stakeholder workshops, scenario building and futuring, the project will formulate new SGC governance strategies. FROM OCEAN TO SPACE aims to derive principles to guide future SGC sustainability frameworks. FROM OCEAN TO SPACE will disseminate the generated knowledge through different artistic interventions.

Resumen del Currículum Vitae:

My scientific qualifications cover interconnected thematic areas in the field of environmental law, law of the sea, and maritime law. My methodological approach moved from the one-conventional legal method (based on the analysis of doctrine and jurisprudence's interpretation of a given case or legal provision) to the acquisition of new techniques of interdisciplinary analysis, mainly when I started being co-supervised by an oceanographer in 2018 in Argentina.

More specifically, my doctoral project and early career research were enriched by studying the environmental implications of hydrocarbon exploration and exploitation in the ocean at the international, South-American and national levels, with insights into research and methodology in international comparative law, energy law maritime law, as well as law of the sea. Afterward, during my postdoctoral stage, I continued studying marine protected areas and marine spatial planning development at the international and national levels.

In 2021, my work was highly ranked by an independent peer review group of German scientists in terms of scientific quality and potential impact, and as a result, I was awarded a six-month junior fellowship by the University of Bayreuth Centre of International Excellence "Alexander von Humboldt". I worked during six months as the principal investigator in a research project at the University of Bayreuth, Germany focusing on Indigenous Peoples and Local Communities (IPLCs) participation in marine environmental regulation.

In March 2023 I come to Europe again because I was awarded the International Climate Protection fellowship by the Alexander von Humboldt Foundation. The fellowship included two three-weeks interdisciplinary seminars and tours specialized on climate change policies and research, we visited more than sixty German and international research institutions dealing with climate change issues. From March 2023 to August 2024, I stayed in Kiel in the Walther Schüking Institute for International Law hosted by Prof. Nele Matz, where I developed my project regarding regulation of renewable energy on the high seas. This long research stay allowed me to build my career in Europe and to do research in an internationally exposed environment. Before 2021, my research was mainly carried out in Spanish, after these international collaborations, I mastered research and advanced my innovation by doing long-term research in English.

In September 2024, I started my Marie Curie Fellowship (MSCA) in Tromsø, which I will continue as of May 2025 in UPV in Spain until August 2026. During my stay in Tromsø, I broadened my research and methodology to the interconnected and critical analysis of comparative law and interdisciplinarity in the fields of ocean governance by the perspectives offered by comparative indigenous law and methodology and marine geology in connection to ecological challenges. I participated in an expedition in November 2025 in the Vessel Kronprins Haakon lead by UiT geologist Prof. Panieri (collaborator in my MSCA project) and we wrote together a book chapter entitled "Extreme environments: Emerging from Ocean into Outer Space Regulation" introducing Ocean-Space Sustainability. This chapter develops one of my last research hypotheses, which states that marine global commons regulation may inform space global commons regulation.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Derecho

Nombre:

CANTERO GAMITO, MARTA

Referencia:

RYC2025-056650-I

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Título:

Transnational normativity in the digital age: Digital governance, standardisation and democratic oversight

Resumen de la Memoria:

My research focuses on understanding the normative architectures of digital governance. In particular, I am interested in how authority, legitimacy and regulatory power are transformed in the age of artificial intelligence. My work combines legal theory, political economy and the study of technical infrastructures to show how hybrid public-private governance regimes shape decision-making in digital ecosystems. Across my career, I have developed an internationally relevant line of research centred on the idea that regulatory authority is increasingly exercised by non-state actors, technical bodies, algorithmic systems and private rulemaking networks that operate beyond traditional democratic oversight.

Two core contributions define this scientific trajectory. First, I have conceptualised foundational frameworks for understanding the regulatory impact of private ordering in digital systems, including standardisation, platform rules and algorithmic decision-making. This agenda was consolidated through my work on digital and AI governance and private regulation, where I developed a layered model distinguishing between infrastructural regulation (standards, data, technical architectures) and content regulation (platform governance, algorithmic enforcement). This framework has become the substantive and methodological core of my research and has contributed to scholarly and policy debates on the legitimacy, normativity and geopolitical implications of technology standardisation and algorithmic rulemaking.

Second, I have advanced a research line that evaluates the normative compatibility of these hybrid governance systems with democratic values, human rights and institutional legitimacy. My work examines how normative choices are embedded in technologies, infrastructures and regulatory designs, and how these choices redistribute power across jurisdictions, institutions and actors. I analyse the growing reliance on technical standards to govern AI and in uncovering the role of private actors in shaping global governance in ways that challenge conventional legal understandings. Through collaborations within large international research projects and international legal networks, my research is contributing to mapping the political economy of digital regulation and governance.

The 5-year research agenda that I propose for the RyC fellowship (Transnational normativity in the digital age: Digital governance, standardisation and democratic oversight) builds on this trajectory but marks a new phase of consolidation and expansion. Its overarching goal is to explain how normative power circulates across public, private and technical actors in AI governance and to develop democratic models for supervising AI systems. The research is structured around three axes: (i) analysing how AI-related technical standards shape the meaning and enforceability of the AI Act; (ii) designing institutional models for democratic oversight and accountability in hybrid public-private governance regimes; and (iii) conducting empirical studies of regulatory ecosystems and AI deployments, combining doctrinal analysis, institutional mapping, qualitative interviews and socio-legal methods. This agenda will produce a unified theory of transnational normativity in digital governance and normative criteria for evaluating delegated technical rulemaking.

Resumen del Currículum Vitae:

I am a legal scholar and expert in digital governance and transnational private regulatory authority, with more than a decade of international academic experience across European top institutions in Italy, Finland, the United Kingdom, Estonia and Spain. My research examines how emerging technologies redistribute regulatory power between public and private actors and how Law can safeguard democratic values in increasingly algorithmic societies.

I completed my PhD in Law at the European University Institute (Florence) with a competitive Salvador de Madariaga grant, after which I developed an independent and internationally recognised research line abroad that integrates legal theory, regulatory governance, political economy and science and technology studies. My work combines doctrinal, empirical and socio-technical methodologies in a way that remains rare in the European legal academy.

I have secured competitive funding, including a grant from the Research Council of Finland, a Spanish I+D+i project, and a Horizon Europe consortium project in which I serve as Principal Investigator for the University of Tartu. As PI, I have built skills in legal analysis, institutional mapping, empirical methodologies and interdisciplinary leadership. My work has advanced knowledge in three areas: 1) the role of technical standardisation in shaping technology governance; 2) transformations of regulatory authority in platform ecosystems; and 3) the evolution of EU digital regulation, with emphasis on democracy and institutional design. This research contributes to shaping debates on AI governance and European digital policy and to strengthening democratic resilience in the context of global technological competition.

My publication record reflects my commitment to high-quality and policy-relevant research. I have authored over 40 works (480 citations and an h-index of 12; Google Scholar), including articles in top journals and co-edited three books on AI governance, transnational private regulation, and economic law, as well as reports that translate conceptual research into policy tools for governments and international organisations. My work is regularly cited in academic and policy circles.

I currently hold a part-time Professorship in Information Technology Law at the University of Tartu, which I joined as Associate Professor in 2018 and, since 2022, a Research Fellow at the Florence School of Transnational Governance (EUI), affiliated to the Chair on AI & Democracy. At the EUI, I co-founded and lead REDemocraciA, an Ibero-American hub on democratic AI governance. I regularly disseminate my work (70+ presentations in the last 3 years) and collaborate with governments and international organisations.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I teach and coordinate master-level and postgraduate courses on AI regulation, platform governance and digital law across several institutions, and supervise master's theses and co-supervise PhD research. I have also served on doctoral committees.

My career is supported by recognised research merits, including a national ANECA research "sexenio" (2014-2019). Moreover, I participate in international expert groups working on digital governance, contribute editorial and peer-review activities for leading journals, serve in programme committees (ACM FAccT, PLSC Europe) and as evaluator for major funding agencies (Swiss NSF, Dutch NWO, Luxembourg FNR).



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Derecho
Nombre: MRABET TEMSAMANI , RABÍA
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Título: Investigadora reconocida

Resumen de la Memoria:

My research career is situated at the intersection of Public International Law, European Union Law, and the legal governance of marine spaces, with a consolidated specialisation in the Law of the Sea, marine environmental protection in straits used for international navigation, and, more recently, the legal framework of marine renewable energies (MRE). Since my PhD awarded with International Mention and the Extraordinary Doctoral Prize I have developed an original, coherent, and internationally oriented research trajectory that combines doctrinal rigour with applied relevance.

My monograph *El Estrecho de Gibraltar: la protección internacional y nacional de su medio ambiente marino* (Dykinson, 2018) constitutes one of the first comprehensive studies devoted to the legal regime governing environmental protection in an international navigation strait. Available in specialised libraries such as ILOS, IMLI and the Peace Palace Library, the work identifies structural deficiencies in UNCLOS regarding the capacity of coastal States to adopt enhanced environmental measures in international straits—an unresolved legal paradox with significant implications for maritime governance. This publication, together with articles in leading journals (*Annuaire du Droit de la Mer*/INDEMER; *Arab Studies Quarterly*; *Ordine Internazionale e Diritti Umani*) and book chapters in prestigious publishers (Elsevier, De Gruyter, Thomson Reuters-Aranzadi), demonstrates my scientific independence and international visibility.

Building on this foundation, my research has evolved towards the legal and technological dimensions of MRE, climate change, and sustainability in highly sensitive marine areas, particularly the Strait of Gibraltar and the Mediterranean region. My PAIDI-21 postdoctoral project (the only one awarded to the Faculty of Social and Legal Sciences, University of Jaén) and my current Acción 7 project—both as Principal Investigator—have strengthened my capacity to lead research teams, manage competitive funding, and generate impactful results.

My career is strongly international: I have undertaken research stays in Belgium, France, Uruguay, Argentina, Malta, Peru, India, Morocco and Bosnia-Herzegovina, and have been invited to deliver lectures in Europe, Asia, Africa and Latin America. I have contributed as consultant to the IOC/UNESCO MSP Global Initiative and served as expert on multiple high-level seminars related to maritime governance and the Strait of Gibraltar, demonstrating the applied impact of my research beyond academia.

The research line I propose for the Ramón y Cajal programme, Legal Governance of Marine Spaces in the Anthropocene, deepens and expands my previous work through an interdisciplinary approach aimed at examining: (1) the regulatory challenges of MRE and their implications for navigation, security, and ecosystems; (2) legal mechanisms for managing environmental risks and transboundary pollution in international straits; and (3) the intersection between ocean governance, climate change, migration, and human rights. This line aligns with the UN Decade of Ocean Science, the European Green Deal, and Spain's strategic priorities in the Blue Economy. Its objectives are to consolidate an interdisciplinary research group, produce high-impact scientific outputs, and position Spain as a European leader in the legal governance of marine spaces

Resumen del Currículum Vitae:

My academic trajectory is centred on Public International Law, EU Law, the Law of the Sea, and marine environmental governance. I hold a PhD in Law from the University of Jaén (2017), awarded with International Mention and the Extraordinary Doctoral Prize. My career has been marked by sustained internationalisation, strong scientific independence, and progressive research leadership. I am currently funded as an Individual Postdoctoral Research Fellow.

I have produced 37 scientific publications, most of which are single-authored, demonstrating autonomy in research:

- 1 monograph (Dykinson, 2018).
- 7 peer-reviewed articles in international journals (*Annuaire du Droit de la Mer*/INDEMER, *Arab Studies Quarterly*, *Ordine Internazionale e Diritti Umani*, *Revista de Estudios Internacionales Mediterráneos*, among others).
- 19 book chapters, published in prestigious international houses such as Elsevier, De Gruyter, Thomson Reuters-Aranzadi, and Dykinson, Tirant Lo Blanch,
- 10 edited books.
- 1 public outreach publication.

I have delivered 65 scientific contributions in 47 international conferences, including more than 15 invited-speaker in countries such as India, Italy, Turkey, Morocco, Cyprus, Argentina, Uruguay, Bosnia-Herzegovina and Spain. I have coordinated symposia in 6 international conferences and served on the scientific committees of 10 others. I am also a member of the scientific committee of an Italian scientific journal specializing in human rights.

My international background includes research stays and academic training in leading institutions: Université Libre de Bruxelles (Belgium), University of the Republic (Uruguay), University of Buenos Aires (Argentina), IMLI (Malta), National University of Trujillo (Peru), Paris Ouest Nanterre (France), Cochin University of Science and Technology (India), TALIM/Tangier (Morocco), and Sarajevo (COST Marsafenet). I was awarded two competitive grants: the COST Marsafenet Training School Fellowship (15 selected worldwide) and the Yeosu Academy of the Law of the Sea Fellowship (South Korea).



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have secured over €323,000 in competitive funding, including:

- Acción 7 Postdoctoral Fellowship € PI (110,077.80 €);
- PAIDI-21 Postdoctoral Fellowship € PI (124,704 €);
- UJA Postdoctoral Contract (8,830 €);
- Additional funds through OTRI contracts (e.g., Egregius SL) and competitive research grants.

My teaching experience exceeds 700 hours, including bilingual teaching in English and postgraduate-level teaching since 2017. I have supervised 4 Master's theses, with 5 currently ongoing, evaluated 16 Master's dissertations (including as president of the tribunal), and supervising a PhD thesis in English, with additional co-supervisions underway.

I have also contributed to knowledge transfer as legal expert for the IOC-UNESCO MSPGlobal project, advisor in a theatre production on maritime law, and consultant in seminars on the governance of the Strait of Gibraltar. I am co-founder of CITECA, the Ibero-American Centre for the Transfer of Academic Knowledge.

Overall, my scientific career demonstrates independence, leadership, consistent productivity, international recognition, and capacity to attract competitive funding. These elements establish a strong foundation for the development of an innovative and high-impact research line within the Ramón y Cajal programme.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Derecho
Nombre: PAPADOPOULOU, NATALY
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Correo Electrónico: natalypapadopoulou13@gmail.com
Título: Socio-legal researcher on health

Resumen de la Memoria:

I completed my LLB (bachelor's in law) at Leicester Law School in the UK and an LLM in Human Rights Law (master's in law) at Queen Mary, University of London. I completed my PhD at Leicester Law School under the direction of Professor Liz Wicks and Dr Tracey Elliott. I was then hired as an Assistant Professor by Huddersfield Law School teaching criminal law, private law, health law, and designing new master's modules, while continuing my research on end-of-life. After a year, I was offered a one-year contract to be an Assistant Professor in Medical Law at the world-renowned Faculty of Law at Queen Mary University of London, where I delivered teaching in the undergraduate and postgraduate courses, designed new modules, and supervised dissertations/ final year projects. But as this was a one-year contract, after it expired, I applied and was hired by Leicester Law School (my alma mater), and from December 2020, I am an Assistant Professor/Lecturer with full research and teaching responsibilities.

My key lines of research are health law and human rights, within the fields of law and politics, ethics and philosophy, and health. My research is for academic lawyers, politicians, healthcare professionals, patients, and for the ordinary person who is interacting with law, practice, and challenges at the end-of-life, conceptualizing and reflecting on questions around death and dying. End-of-life, is a topical, global issue. I consider that its proper study requires high-quality legal research, comparisons, collaboration with other disciplines and creativity. My expertise, assisted death, is a global phenomenon, and a pressing contemporary challenge yet an opportunity for countries to improve relevant regulations and healthcare practice. I carry out my work under three streams:

1. I study the legal and political process leading to regulation (Parliament, courts, individual action & public initiatives, referendums, judicial creativity).
2. I study the letter of the law/ the content of the law, by using comparison and data from jurisdictions with existing laws on assisted dying, studying in detail access criteria and safeguards and how they can be drafted, proposed, implemented.
3. Finally, I engage in extensive multidisciplinary work and collaboration to assess past approaches to death and dying to re-assess cultural, relational approaches to it, improve efficiencies in current regulation, its enforcement, and improve public understanding of end-of-life choices. The voice of those at the heart of the end-of-life process is key here, and work via LeicSurvey, for instance, aims to put the patient at the heart of feedback-gathering and service improvement.

This month, I re-submit my monograph proposal and a 17,000-word chapter to Hart/Bloomsbury. I have 5 articles in first drafts, and due chapters due in the next two months (accepted, forthcoming).

As a summary, my work contributes to the study and prediction of processes leading to reform, to in-depth analysis of how law is shaped (safeguards, criteria), and to holistic understandings of death and dying for patients, professional, society.

Resumen del Currículum Vitae:

I have established and now coordinate two research groups:

1. The Deliberate Dying research group (Leicester) made of emergency physicians, clinical psychologists, archaeologists and historians, legal academics, English scholars, and palliative care physicians. We engage in publications, grant applications, public events, PhD student support.
2. The European End-of-Life Research Network which I establish and lead after a Brocher Grant in January 2025 (40 researchers from 25 European countries).

I am the co-founder of a successful survey tool that was designed with hospices, but now implemented in cultural hubs, health groups, educational settings. I am the Client Experience and Compliance Director for the company (registered). The project has attracted considerable funding, and involves the hiring of personnel. We employ: 2 permanent software developers, 6 students as secretaries/ research assistants, 2 web/logo designers. Total surveys: >3500 in 4 countries.

I am part of projects awarded in total aprx £245,000 (e.g. in C3). As PI/coPI, I obtained £2,300 (LIAS) (Re1); £1,700 (Leic Hospitals) (Re2); £8,500 Brocher (Re4); £18,300 British Academy (Re8); £8,000 UKRI (Re9); £1,700 ESRC (Re10) = £40,500

I have produced around 25 scientific contributions: book, chapters, articles, expert reports, reviews, newspapers articles, blogs. I am sole author in 12/25 and lead author (CA) in 17/25. I co-authored a book (Elgar) (Pub1) and two book chapters in it; 10 journal articles (e.g. in Pubs3-10), 8 lay publications (e.g. KT8-10), 6 expert reports to Parliaments/government bodies (3 sole authored, 3 co-authored but as CA) (KT2-7).

I spoke in over 30 conferences/congresses/lectures in 7 countries. I completed research stays in Belgium and Spain, and currently planning one in Australia and Italy.

I have 5 PhD students one of whom defended in January 2025. I am regularly part of annual PhD reviews, and deliver PhD training on methodology, publishing, impact, well-being. I am involved with student societies and peer-review for student journals.

I peer-review, among other, for the top medical law journals Medical Law International SJR 0.381, h-index15 (2025), Q2 Law, Medical Law Review SJR 0.482, impact 2025 1.60, h-index34, Q1 Law, 234/1089.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Derecho
Nombre: TASSINARI, FRANCESCA
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Correo Electrónico: francescatassinari92@gmail.com
Título: From Interoperability to Standardisation: The Legal Foundations of the European Union's Data Strategy

Resumen de la Memoria:

My research trajectory is characterised by a consistent and highly specialised focus on data protection, interoperability, and EU external relations, with a particular emphasis on the protection of fundamental rights in technologically mediated governance contexts. My academic path began with early research on migrants' rights and access to international protection, later evolving into a sophisticated legal analysis of biometric technologies, large-scale information systems, and cross-border data transfers in the Area of Freedom, Security and Justice (AFSJ). My doctoral research developed a pioneering legal theory on the external reach of European Union (EU) interoperability in the AFSJ. The PhD explored the legal foundations of EU external competence in data protection, the international transfer of personal data, and the limits of the Union agency powers, particularly in relation to the freedom, security and justice agencies, including eu-LISA. This work positioned me as one of the first scholars to systematically analyse the global implications of the interoperability frameworks under Regulations (EU) 2019/817 and 2019/818. My postdoctoral phase marks a decisive expansion from security-driven interoperability to cross-sectoral data governance, especially in the fields of health and police cooperation. Within competitive research projects such as GODAS and DASIR-SP, I addressed the secondary use of special categories of personal data, migrants' health and the vulnerable groups of people affected thereto, and the growing interconnection between different data spaces. My 2024 monograph with Brill/Nijhoff, 'Data Protection and Interoperability in EU External Relations', consolidates this trajectory and confirms my international leadership in the field. A key dimension of my profile is the integration of legal theory with regulatory practice. My experience as a legal and policy officer at the European Commission (DG HOME – B3 Digital Schengen Unit) enabled direct participation in the legislative, technical, and diplomatic implementation of EU interoperability. This dual academic-institutional background strengthens the applied relevance of my research and supports sustained collaboration with EU agencies, national authorities, and private stakeholders. My future research line under the Ramón y Cajal program represents a paradigmatic shift from interoperability to standardisation as the legal foundation of data-driven governance. I will critically examine the normative nature, legitimacy, and global impact of technical standards, particularly in the context of the European Health Data Space (EHDS), mobility, and Green Deal data spaces. The research investigates the delegation of regulatory power to private standardisation bodies (CEN, CENELEC, ETSI), the (critical) interaction with global actors (ISO, IEC, ITU), and the geopolitical implications of EU digital sovereignty under instruments such as the Artificial Intelligence (AI) Act and the forthcoming Digital Omnibus Regulation. Overall, my research agenda bridges digital governance and fundamental rights under EU and international law, offering a robust legal framework to assess how interoperable technologies reshape power, legality, and human rights at both the European and global levels.

Resumen del Currículum Vitae:

I am a Juan de la Cierva postdoctoral researcher at the University of the Basque Country (UPV/EHU), specialised in EU and international law, privacy, data protection, and interoperability. My academic profile combines solid theoretical research with hands-on regulatory, legal, and policy experience at the European Union (EU) level. I hold a Double PhD in Legal Sciences and in EU Law and National Legal Systems from the Universities of Granada and Ferrara (2022), awarded cum laude with international mention and recognised with the Royal Academy of Jurisprudence and Legislation of Granada Award for the best doctoral thesis in Public Law. My scientific production includes around 40 research outputs, among them 1 monograph with Brill/Nijhoff, 12+ peer-reviewed journal articles, 20+ book chapters, and several conference papers and blog posts publications. My work has received multiple distinctions, including the recent Giuseppe Tesaro Award of the Italian Association of EU Law Scholars (AISDUE). I work fluently in four languages: Italian (native), Spanish (C2), English (C1), and French (C1). After completing my Double Law Degree with maximum honors in Italy and Spain (2016), I was awarded a national FPU predoctoral fellowship (2018-2022). My PhD developed a pioneering legal theory on the external dimension of EU interoperability in the Area of Freedom, Security and Justice (AFSJ), focusing on biometric data, large-scale IT systems, and international data transfers. During this period, I carried out a long research stay at the MacroCrimes Centre of the University of Ferrara and completed the European Commission Blue Book Traineeship. Because of the innovative nature of my research, I was recruited by the European Commission (DG HOME – B3 Digital Schengen Unit) first as a trainee and later as a Legal and Policy Officer (2022-2023). There, I supervised the technical implementation of the EU interoperability framework under Regulations (EU) 2019/817 and 2019/818, coordinated relations with eu-LISA, and led a new legislative initiative on international security data exchange. In 2024, I joined UPV/EHU under a Juan de la Cierva fellowship, integrating into the CIJSANT Research Group. My research then expanded towards health, genetic, and biometric data, and artificial intelligence (AI). I currently lead the UPV/EHU team within the IMPaCT Data strategic project, and I acted as Principal Investigator (PI) of the DASIR-SP project, funded by the Víctor Grifols i Lucas Foundation, which included empirical research with migrants and professional experts in epidemiology and public health. My international profile is reinforced by 3 postdoctoral research stays at the Vrije Universiteit Brussel, the Maastricht Centre for European Law, and the Hague Academy of International Law. I am an active invited speaker at international academic and institutional forums, coordinator of scientific events, mentor in the ESIL Early-Career Network, and co-supervisor of a PhD candidate. As a Ramón y Cajal beneficiary, my medium-term objective is to consolidate an independent research line on EU digital standardisation, interoperability, and data governance, and to compete for national research projects, ERC grants, or Horizon Europe funding.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Derecho

Nombre:

GARCIA GODINEZ, MIGUEL

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RYC2025-054415-I

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Título:

Teoría del Derecho, Ontología Social y Regulación de Tecnologías Inteligentes

Resumen de la Memoria:

La trayectoria investigadora presentada desarrolla una línea de trabajo situada en la intersección entre filosofía del derecho, ontología social, teoría de la responsabilidad colectiva y gobernanza de la inteligencia artificial (IA). Sus contribuciones articulan una agenda que combina análisis conceptual con aplicaciones prácticas y normativas a problemas contemporáneos, especialmente los derivados de la implementación de sistemas de IA en varios sectores y contextos institucionales.

Una parte sustancial de la producción científica se centra en la elucidación de diversas formas de agencia [individual, colectiva, e institucional] y en sus implicaciones para la atribución de responsabilidad. Destacan aportaciones originales sobre la estructura normativa de la intencionalidad colectiva, la naturaleza de la agencia institucional y el modo en que los grupos formalmente organizados actúan mediante representantes. Estas investigaciones inciden en debates centrales de la ontología social y ofrecen modelos explicativos novedosos sobre cómo surgen y operan entidades institucionales como las corporaciones, los Estados y las organizaciones internacionales.

En paralelo, el trabajo desarrolla una propuesta metodológica para evaluar riesgos normativos asociados a sistemas de IA, especialmente en el marco del Reglamento de IA de la UE. A través de una teoría del razonamiento normativo derrotable, se formulan metodologías cualitativas para examinar impactos en derechos fundamentales, identificar vacíos de responsabilidad en cadenas de decisión automatizadas y diseñar categorías de riesgo más sensibles a contextos de uso. Esta línea se complementa con estudios comparados y con la elaboración de marcos conceptuales destinados a orientar la adopción responsable de tecnologías de alto riesgo.

La trayectoria incluye contribuciones en ontología jurídica, con defensas sistemáticas de enfoques deflacionarios sobre la realidad jurídica, análisis de reglas constitutivas y estudios sobre la institucionalización de la validez jurídica. Estos trabajos dialogan con autores contemporáneos destacados y aportan claridad a cuestiones fundamentales sobre la estructura de los sistemas jurídicos y la naturaleza de las prácticas normativas.

La producción científica se ve reforzada por una sólida actividad de internacionalización y liderazgo: estancias postdoctorales en universidades de prestigio, invitaciones a congresos internacionales, organización de talleres y seminarios especializados, participación en redes de investigación y dirección de proyectos financiados. Asimismo, la labor editorial, la colaboración interdisciplinar y la coordinación de grupos de investigación consolidan un perfil investigador independiente, capaz de integrar aportaciones provenientes de la filosofía, el derecho y los estudios sobre tecnología.

En conjunto, la trayectoria muestra una evolución coherente hacia el estudio de la responsabilidad institucional en escenarios mediados por IA, asentada en una base teórica sólida sobre la agencia colectiva y las estructuras institucionales, y orientada a ofrecer herramientas normativas útiles para los retos emergentes de la gobernanza tecnológica.

Resumen del Currículum Vitae:

Desde que obtuve mi doctorado en Derecho por la Universidad de Glasgow en 2021, he orientado mi carrera a investigar la filosofía del derecho, la ontología social y la gobernanza de la inteligencia artificial, combinando análisis conceptual, metodología normativa y un enfoque interdisciplinar. He desarrollado esta agenda a través de tres estancias posdoctorales altamente competitivas en México, Irlanda e Italia.

Actualmente soy Investigador Postdoctoral en la Universidad de Bolonia, donde contribuyo al programa nacional de Inteligencia Artificial (IA) Responsable mediante el desarrollo de modelos cualitativos para evaluar los riesgos legales y éticos de los sistemas de IA conforme a la legislación europea vigente. Mi trabajo reciente incluye un marco no monotónico para razonar con categorías de riesgo y la coautoría de un capítulo sobre metodologías formales de evaluación del impacto de la IA en derechos fundamentales.

Durante mi estancia en University College Cork (2022-2024), investigué la agencia por delegación en contextos institucionales y elaboré una teoría de la responsabilidad estatal y corporativa basada en relaciones de representación. Este proyecto me permitió avanzar un modelo alternativo de responsabilidad institucional que supera los límites de las concepciones puramente individuales o colectivas, sentando también las bases conceptuales para mi investigación actual en IA y riesgo normativo.

En mi primera estancia posdoctoral en la UNAM (2021-2022), desarrollé un enfoque original sobre la agencia institucional, integrando la ontología social con debates metaontológicos contemporáneos acerca de la constitución de entidades sociales y sus funciones normativas. Este trabajo profundizó la comprensión de la realidad institucional y su relación con la práctica jurídica.

Mi producción científica actual asciende a 28 trabajos, incluidos 18 ensayos arbitrados en revistas internacionales. He coeditado cuatro volúmenes y publicado una monografía temática, además de varios trabajos que están actualmente en dictaminación en revistas de alto impacto. Mis publicaciones abordan temas tan diversos como la agencia institucional, el carácter artifactual del derecho, la ontología de las prácticas sociales, la naturaleza de los derechos jurídicos y la regulación de la IA.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Participo activamente en la comunidad académica como Editor Asociado del Journal of Social Ontology y como revisor para varias revistas internacionales de filosofía, teoría del derecho y ética de la IA, además de evaluar proyectos para agencias nacionales en Europa. He recibido apoyo competitivo de instituciones como IRC, EDUFI, ISOS, la Modern Law Review y organismos públicos mexicanos, gestionando con éxito financiación por aproximadamente €300.000. Soy miembro de asociaciones profesionales, como STS Italia y el UK Law & Philosophy Network, y cofundador tanto del Social Ontology Research Group como de la Red Europea de Filosofía del Derecho y Ontología Social. Mi experiencia docente incluye cursos de lógica jurídica en la UNAM y actividades de enseñanza acreditada en la Universidad de Glasgow.

En conjunto, he consolidado una trayectoria internacional y una agenda de investigación interdisciplinaria e innovadora que articula la filosofía del derecho y la ontología social con los retos normativos emergentes de la inteligencia artificial y sus implicaciones institucionales.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Derecho

Nombre:

PECILE PECILE, VERONICA

Referencia:

RYC2025-055729-I

Correo Electrónico:

veronica.pecile@hotmail.it

Título:

Teoría crítica del derecho, propiedad y justicia ecológica

Resumen de la Memoria:

Mi trayectoria investigadora se ha configurado en torno a una preocupación central: comprender cómo el derecho, lejos de ser un conjunto neutro de normas, se convierte en un espacio de disputa política, social y ecológica. Desde mis primeros trabajos de doctorado, he estudiado cómo los movimientos sociales experimentan con formas alternativas de propiedad, especialmente los bienes comunes (commons), y cómo estas prácticas abren horizontes jurídicos distintos a los modelos dominantes de titularidad y gestión de recursos.

Tras obtener el doctorado en la EHESS, inicié un recorrido posdoctoral marcado por la movilidad internacional y la colaboración interdisciplinar. Las estancias financiadas en el Institute for Global Law and Policy de Harvard, el Collegium Helveticum de ETH Zürich, el Swiss Institute en Roma y la Universidad LUMSA me han permitido integrarme en comunidades académicas diversas y ampliar mi marco metodológico mediante la combinación de análisis jurídico, enfoque histórico-crítico y sociología del derecho. En estos contextos he contribuido a líneas de trabajo consolidadas y he reforzado mi propio perfil independiente.

Mi investigación publicada aborda cuestiones como las transformaciones contemporáneas de la propiedad, las formas jurídicas emergentes en contextos de crisis urbana y ecológica, y la genealogía de las formas del derecho moderno. Una constante en mi producción científica ha sido vincular el análisis conceptual con estudios empíricos, de modo que la teoría jurídica pueda basarse en prácticas sociales concretas.

La línea de investigación que deseo desarrollar en el futuro parte de esta experiencia acumulada y se dirige hacia un proyecto más amplio sobre propiedad y crisis climática. El objetivo general es examinar cómo los actores sociales – comunidades locales, movimientos ecológicos, colectivos urbanos – emplean el derecho para redefinir las relaciones entre seres humanos y entornos naturales en una lógica que no sea la de la propiedad privada y adoptando formas propietarias alternativas. Esta perspectiva permitirá elaborar herramientas conceptuales y propuestas jurídicas orientadas a modelos de gobernanza ambiental más equitables.

Esta nueva etapa supone una ampliación respecto a mi trayectoria previa: si bien mi investigación se ha centrado principalmente en el análisis histórico y socio-jurídico de los commons, ahora busco desarrollar una agenda más sistemática sobre la transformación jurídica necesaria ante el deterioro ecológico global. Con ello se pretende avanzar hacia una teoría crítica de la propiedad capaz de dialogar con debates contemporáneos sobre justicia climática y reforma institucional.

Resumen del Currículum Vitae:

Mi trayectoria investigadora se sitúa en la intersección entre la filosofía jurídica, la sociología del derecho y los estudios críticos del derecho. Desde mi tesis doctoral, defendida en 2019 en la EHESS de París, desarrollo un programa de investigación centrado en dos ejes complementarios: por un lado, el análisis de cómo los movimientos sociales emplean el derecho para articular reivindicaciones de justicia social y ecológica; por otro, un estudio genealógico y crítico a las formas jurídicas modernas, en particular a la propiedad.

Mi tesis examinó el uso político y jurídico de los bienes comunes como forma alternativa de propiedad en el Sur de Italia en la década posterior a la crisis económica de 2008. Este trabajo culminó en la monografía "Law, Social Movements and the Politics of the Commons: Cases from the Italian South" (Routledge, 2025). El libro condensa varios años de investigación empírica y teórica, combinando análisis histórico-jurídico, trabajo de campo y la reconstrucción conceptual de los instrumentos legales empleados por colectivos urbanos.

Tras el doctorado, mi trayectoria postdoctoral ha sido fuertemente internacional. He llevado a cabo estancias y contratos de investigación en instituciones de referencia, entre ellas el Institute for Global Law and Policy de Harvard (en 2021/22), el Collegium Helveticum de ETH Zürich (en 2022/23), el Instituto Suizo de Roma (en 2023/24) y la Universidad LUMSA de Roma (desde 2024). En estos contextos he ampliado y consolidado mi agenda científica, integrando perspectivas de la historia del derecho, la teoría crítica, los estudios sócio-jurídicos y los estudios ambientales.

Mis publicaciones abordan cuestiones como la teoría crítica de la propiedad, la temporalidad jurídica, la creatividad jurídica de los movimientos urbanos y los instrumentos jurídicos para afrontar la crisis ecológica. He publicado en Rivista critica del diritto privato, Oñati Socio-Legal Series, Comparative Law Review, City & Analysis of Urban Space, Theory, Action, así como en diversas obras colectivas de editoriales internacionales. Mis aportaciones buscan articular una lectura crítica de la propiedad contemporánea y de sus efectos socioecológicos, poniendo de relieve cómo prácticas jurídicas subalternas cuestionan la arquitectura legal dominante.

Mi actividad científica incluye responsabilidades editoriales, tareas docentes y de mentorización, participaciones como conferenciante invitado en universidades europeas, y la evaluación académica en tribunales doctorales. Estos roles reflejan mi compromiso con la formación de jóvenes investigadores y la consolidación de redes internacionales de colaboración.

A medio y largo plazo, mi objetivo es desarrollar una línea de investigación que replantee las categorías jurídicas fundamentales (especialmente la propiedad) a la luz de la crisis climática y ecológica. Pretendo articular un marco crítico que vincule historia del derecho, estudios socio-legales y teoría política, con el fin de comprender y potenciar las formas emergentes de gestión común y de relación jurídica con el mundo natural.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: FERRARI, ALESSANDRO
Referencia: RYC2025-054402-I
Correo Electrónico: alessandro.ferrari@upf.edu
Título: Aggregate Consequences of Firm Behaviour
Resumen de la Memoria:

I have received my PhD in 2020 from the European University Institute (EUI), under the supervision of Prof. Ramon Marimon (EUI) and Prof. Philipp Kircher (Cornell University), with the thesis "Essays in International Macroeconomics". The thesis committee was formed by Prof. Pol Antras (Harvard) and Isabelle Mejean (Sciences Po).

After completing my PhD I joined the University of Zurich as an Assistant Professor, where I was an active member of the Macroeconomics group. I organized the macroeconomics seminar and advised multiple students at all levels (bachelor, master, PhD). In my 4 years and a half in Zurich I completed 4 publications and finished 4 working papers. I have published in the Journal of Public Economics, Journal of International Economics, AEA Papers and Proceedings, AEJ: Macroeconomics and one of my papers has been invited for resubmission at the Review of Economic Studies, one of the top5 journals in economics.

In January 2025 I joined the department of economics of Universitat Pompeu Fabra as an Assistant Professor. At UPF I will co-organize the macroeconomics and international economics seminar, inviting prestigious speakers from the best departments in the world.

In January 2024 I was invited to be a Research Affiliate of the CEPR research network in the Macroeconomics and Growth as well as International Trade and Regional Economics research programmes.

My research interest lie at the intersection between macroeconomics and international economics. Most of my research has as a common thread the interest in the aggregate consequences of firm behaviour. This has led me to write research papers investigating the role of production networks as a conduit of shock propagation, market power as an amplifier of business cycles, the role of profit shifting in shaping the effect on international tax reform and a series of papers concerned with determinants of supply chains resilience and fragility.

This latter line of research has been awarded a large grant by the Swiss National Science Foundation Project grant to investigate the role firm choices in shaping supply chain fragility. I am the sole PI of this project. This is a very competitive grant for the duration of 3 years and the amount equal to 258.536 euros. I have used this grant to purchase proprietary data, hire a pre-doctoral research assistant and fund the organization of a workshop related to the topics of the grant at the Barcelona Summer Forum. I have already written 3 papers based on the projects of this grant. I will continue this line of research also thanks to the funding for 40.000 euros from the Foundation Ramon Areces, a grant for which I am the sole PI.

In my two academic appointments at the University of Zurich and Universitat Pompeu Fabra I have also had the pleasure to advise a number of students at the PhD, Master and Bachelor level. In particular, I have so far advised 8 PhD students, of which 3 have already completed their studies and found placements at ESADE, Bank of England, Bank of Italy and the University of Geneva.

I have also taught 4 different courses at all levels (BA, MA, PhD).

Resumen del Currículum Vitae:

Supply Chains Resilience and Sourcing Patterns

In joint work with Yiliang Li, Lorenzo Pesaresi and Francesco Zanetti, we combine the theoretical insights of Ferrari and Pesaresi (2025) with new data on shipping and customs. We merge US bill-of-lading records with granular vessel-tracking information and firm-level data from Compustat, allowing us to test predictions on firms' specialization choices and their implications for supply-chain resilience. We study how firms react to supply-chain disruptions measured finely through ship-tracking data by examining adjustments in their supplier pool. Do firms wait for temporary disruptions to fade, or do they switch to new suppliers? Does this depend on market thickness or supplier specialization? This dataset enables us to answer these questions and inform theories linking delays in supplier relations to supply-chain resilience.

Market Power and Returns to Scale

Over the past forty years, a small set of superstar firms has gained a growing share of global profits. Two mechanisms may explain this: higher markups over marginal cost or increasing returns to scale, each implying opposite policy responses—antitrust for market power, efficiency promotion for scale economies. Existing methods cannot disentangle the two, as identifying markups assumes constant returns, and identifying scale requires unrealistic competition assumptions. In work with Paolo Mengano and Francisco Queiros, we develop an empirical strategy that recovers both forces jointly and build a model to quantify their welfare effects. We provide evidence on the relative importance of market power versus efficiency in driving profit trends, a theory rationalizing these patterns, and the welfare gains from the correct diagnosis. If rising profits reflect technology-driven scale effects, policy intervention is unnecessary; if driven by market power, stronger antitrust is required.

International Effect of Monetary Policy in an Interconnected World

In ongoing research with Alireza Tahbaz-Salehi, we examine how the global production network shapes the international spillovers of monetary policy through exchange-rate movements. We develop a theoretical framework to analyze an economy with production networks and arbitrary invoicing patterns, enabling both positive and normative analysis. We characterize how, for example, the Fed's monetary stance affects countries depending on the structure of production linkages and invoicing choices. We also study the efficient policy under international coordination and quantify potential losses from unilateral policy in a Nash equilibrium.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: GHASSIBE, MISHEL
Referencia: RYC2025-054261-I
Correo Electrónico: mghassibe@crei.cat
Título: Macroeconomics and Production Networks
Resumen de la Memoria:

My research examines how the structure of the economy—its production networks, firm heterogeneity and underlying frictions—shapes the transmission of macroeconomic policy. Across my projects, I aim to show that aggregate outcomes cannot be understood without accounting for the microeconomic links through which shocks propagate.

One core line of work focuses on monetary policy in production networks. In my paper “Monetary Policy and Production Networks: An Empirical Investigation” (Journal of Monetary Economics, 2021), I document that input–output linkages substantially amplify monetary shocks: at least a third of the impact on aggregate consumption operates through supply-chain connections. I also show that this amplification is highly concentrated in a small number of upstream sectors. These findings provide direct evidence that the network structure of the economy is a key determinant of policy effectiveness.

A second strand of my research studies fiscal policy and its state dependence. In “State Dependence of Fiscal Multipliers: The Source of Fluctuations Matters” (Journal of Monetary Economics, 2022, with Francesco Zanetti), I develop a framework that distinguishes recessions driven by demand from those driven by supply. We show that government spending multipliers are large in demand-driven downturns but small—or even negative—when recessions stem from supply disruptions. Meanwhile, supply-side policies such as payroll tax cuts are most effective in supply-driven recessions but have limited traction in demand-driven ones. This work helps reconcile the mixed empirical evidence on fiscal multipliers by emphasising the role of the economic environment.

I also study non-linear monetary transmission in settings where production networks adjust endogenously. My working paper “Endogenous Production Networks and Non-Linear Monetary Transmission” (2024 revision) develops a model in which firms re-optimize their supplier relationships in response to shocks. The result is a set of non-linearities that can substantially alter policy transmission depending on the configuration of the network.

My ongoing research continues to explore the micro-to-macro mechanisms behind aggregate fluctuations. In “Intertemporal Pass-Through” (2025, with B. Wanengkirtyo and I. Yotzov), I examine how price adjustments unfold over time and how different forms of pass-through shape macroeconomic dynamics. In “Business Cycles with Pricing Cascades” (2025, with A. Nakov), I study how sequential price-setting across supply chains can generate amplification and persistence in business cycles.

Across these projects, the unifying theme is clear: macroeconomic shocks do not operate in a vacuum. They move through a complex network of firms and sectors, and their ultimate impact depends on the structure, frictions and state of that network. My goal is to integrate these features into macroeconomic analysis in a way that improves our understanding of policy transmission and enhances the relevance of macro models for real-world decision-making.

Resumen del Currículum Vitae:

I am a tenure-track Junior Researcher at CREI, an Affiliated Professor at the Barcelona School of Economics (BSE), as well as a Research Affiliate at the Centre for Economic Policy Research (CEPR). My research interests are in macroeconomics, with a particular focus on the implications of goods market frictions and production networks for monetary and fiscal policy. I am also an academic consultant at the European Central Bank (ECB), as well as an academic visitor at the Bank of England (BoE).

I received my PhD from the University of Oxford in July 2022. My doctoral work has received the Edgeworth Prize from the Department of Economics for the best thesis. During my PhD, I also held a visiting position at the University of California-Berkeley, as well as research placements at the Bank of England, International Monetary Fund, and the National Bank of Ukraine.

My research portfolio consists of two published papers, both in the Journal of Monetary Economics, one advanced working paper ready for submission, as well as three ongoing projects. For one of my published articles, “Monetary Policy and Production Networks: An Empirical Investigation”, I received the 2020 European Economic Association (EEA) Young Economist Award, as well as an award at the 2018 European Central Bank (ECB) Sintra Forum. My advanced working paper, “Endogenous Production Networks and Non-Linear Monetary Transmission”, has received the Best Paper Prize at the 2022 European Winter Meeting of the Econometric Society.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: CONTE LEITE, BRUNO
Referencia: RYC2025-057352-I
Correo Electrónico: bruno.conte@upf.edu
Título: Green Globalization: Spatial Interconnections of Energy, Water, and Economic Activity
Resumen de la Memoria:

I am an Assistant Professor at Universitat Pompeu Fabra (UPF) and an Affiliated Professor at the Barcelona School of Economics (BSE). My academic trajectory began with a Ph.D. in Economics from the Universitat Autònoma de Barcelona (2021), followed by an Assistant Professorship at the University of Bologna. I have since established myself as a scholar at the intersection of environmental, spatial, and international economics, holding merit-based affiliations at CREI, CEPR, CESifo, IGC, and LdA.

My research agenda is driven by a central objective: to uncover the complex, often hidden, interconnections between the global economy, the physical environment, and policymaking. To achieve this, I develop and quantify novel spatial frameworks that integrate economic theory with high-resolution data. My work to date has focused on the welfare consequences of climate change and the adaptation mechanisms available to societies.

In my published research, I have demonstrated how migration and sectoral specialization act as crucial margins of adaptation to global warming (Conte et al., 2021), while highlighting the "trapped population" risks in developing regions like Africa (Conte, 2025). I have also explored the policy dimensions of environmental shocks, analyzing the efficacy of unilateral versus multilateral carbon taxes (Conte et al., 2025) and the role of market integration in mitigating health crises caused by environmental disasters (Conte et al., 2023).

Building on this foundation, my future research lines will pivot toward the spatial economics of natural resources, specifically Water and Energy.

In the Water research line, I will develop a project to address the causes of (and solutions for) a potential global water crisis. By constructing a dynamic spatial integrated assessment model that couples the planetary hydrological cycle with the global trade network, I aim to quantify how virtual water trade and industrial policies affect water security. This work will provide the first framework to design policies that internalize the cross-border externalities of water depletion.

In the Energy research line, I will investigate the geography of the green transition ("Green Development"). I am developing a quantitative framework to analyze whether the shift to renewables—which rely on dispersed solar and wind endowments rather than concentrated fossil fuels—will foster economic convergence or if historical inertia and trade costs will widen the gap between developed and developing nations.

Resumen del Currículum Vitae:

I am an economist specialized in environmental and spatial economics, currently serving as an Assistant Professor at Universitat Pompeu Fabra and an Affiliate at the Barcelona School of Economics. Since obtaining my Ph.D. in 2021, I have rapidly established a reputation for research excellence, independence, and leadership within the international academic community.

Research Impact and Recognition: My work has been published in top-tier general interest and field journals, including the Journal of the European Economic Association, The Economic Journal, Journal of Economic Geography, Journal of Health Economics, and Nature Climate Change. My research has garnered significant attention, evidenced by a growing citation record (281 total, with 91 in 2025 alone) and coverage in major policy outlets. My standing in the field was recently consolidated by the receipt of the CESifo Distinguished Research Affiliate Prize and four merit-based affiliate nominations in 2025 (CEPR, CREI, LdA, IGC).

Funding and Independence: I have demonstrated a strong capacity to secure and manage competitive research funding. As Principal Investigator, I have attracted approximately 300,000 euro in grants from prestigious agencies, including the European Commission (Marie Skłodowska-Curie Fellowship), the Ramón Areces Foundation, and the EIEF. My experience extends to managing international research teams and coordinating complex multi-year projects.

International Network and Mobility: My career is defined by global engagement. I maintain active collaborations with leading scholars such as Esteban Rossi-Hansberg and Klaus Desmet and have been invited for research visits at the University of Chicago, LSE, and EIEF. My dissemination activities include over 50 presentations at top universities and conferences worldwide. Additionally, I bridge the gap between academia and policy through consultancy roles for the World Bank and the United Nations.

Service and Leadership: I play a proactive role in the scientific community. I regularly serve as a referee for top-five economics journals (AER, JPE, RESTUD) and grant agencies (Swiss National Science Foundation). I am also a key organizer of high-impact events, such as the Econometric Society-CEPR Economics+Climate Science Conference. Finally, I am dedicated to mentoring young talent; my advisees at the Ph.D., Master's, and undergraduate levels have successfully secured competitive positions in doctoral programs and international organizations, with recent students receiving national awards for their thesis work.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: ARTEAGA CABRALES, MARIA CAROLINA
Referencia: RYC2025-054432-I
Correo Electrónico: carolina.arteaga@cemfi.es
Título: The Economics of Adversity and Marginalization

Resumen de la Memoria:

Carolina Arteaga is an applied microeconomist whose research examines how adversity, inequality, and marginalization shape individual and societal outcomes. Her work spans health, education, crime, and political economy and is unified by a commitment to causal identification, policy relevance, and methodological rigor. She combines reduced-form approaches and randomized controlled trials with original data collection strategies, including administrative data linkages, archival research, experiments, and text-based methods.

Her research has been published in Quarterly Journal of Economics, The Review of Economics and Statistics, Journal of Political Economy: Microeconomics, and Journal of Public Economics, and has informed major policy discussions, including citations in the 2024 Economic Report of the President of the United States and the Congressional Budget Office reports. It has been featured in The New York Times, The Wall Street Journal, The New Yorker, and The Financial Times, and included in course syllabi at Harvard, the University of Chicago, Columbia, and UC Berkeley among others.

One line of work investigates the long-run consequences of the opioid epidemic. Using newly uncovered marketing records from Purdue Pharma, she and coauthor Victoria Barone developed an instrument to identify causal effects of the crisis. They show that opioid exposure increased mortality, disability, poverty, and Republican vote share—shaping political polarization over two decades. This paper is forthcoming in the Quarterly Journal of Economics. In follow-up work, they examine how the opioid epidemic shaped demographic trends in exposed communities and document lower population growth driven by increased out-migration—particularly among women and individuals with some university education—as well as higher mortality rates. At the same time, they find higher fertility rates in these locations, which have partially offset the population losses.

Another stream of research examines intergenerational consequences of incarceration. Published in the Review of Economics and Statistics, Carolina exploits judge assignment randomization in Colombia and extends standard treatment frameworks, she shows that parental incarceration increases educational attainment for children at the margin of incarceration. Leveraging administrative data from Colombia, she constructed a dataset linking over 90,000 convicted low-income parents with their children's academic records and extends the potential outcomes framework to distinguish between conviction and incarceration. She finds that incarceration—contrary to prior expectations—increases educational attainment for children on the margin of incarceration. The findings point to deep-seated pre-existing disadvantage in affected households and have inspired follow-up work in both applied and methodological literatures.

Additional work explores how partisan identity shapes belief formation, the causal role of human capital in wage determination, the spillover effects of spousal health shocks, and the impacts of specialized domestic violence courts.

Across these projects, her research highlights the lived consequences of structural inequality and aims to inform more inclusive and effective public policy.

Resumen del Currículum Vitae:

CURRENT ACADEMIC APPOINTMENT

Assistant Professor Department of Economics University of Toronto, 2019-
Visiting Professor University of Chicago, 2025-

PROFESSIONAL AFFILIATIONS

Faculty Research Fellow National Bureau of Economic Research, 2025-

RESEARCH

“Republican Support and Economic Hardship: The Enduring Effects of the Opioid Epidemic” with Victoria Barone. Forthcoming at The Quarterly Journal of Economics.

“The Effect of Human Capital on Earnings: Evidence from a Reform at Colombia’s Top University” (2018). Journal of Public Economics. Vol 157, January. pp 212-225.

“Parental Incarceration and Children's Educational Attainment” (2023) Review of Economics and Statistics. November. pp 1394-1410.

“Is it the Message or the Messenger? Examining Movement in Immigration Beliefs” (2024) with Hassan Afrouzi and Emily Weisburst. (2024) Journal of Political Economy: Microeconomics

“Population Decline, Migration and Fertility: The Legacy of the Opioid Epidemic” with Victoria Barone and Stephen Claassen



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

☐Health Spillovers: The Broad Impact of Spousal Health Shocks☐ with Natalia Vigezzi and Pilar Garcia-Gomez

☐Improving Access to Justice for Victims of Intimate Partner Violence: Specialized Domestic Violence Courts in Puerto Rico☐ with Gustavo Bobonis, Paola Salardi and Dario Toman

As a leading scholar in my field, I have published in top journals, and my work has garnered broad visibility and influence, with over 300 citations to date.

My research has had policy resonance and media reach. I have presented my work at many of the world's top research institutions, including Yale, University of Pennsylvania, Brown, University of Chicago, Columbia, and others, as well as at major conferences such as the NBER Summer Institute, BSForum, SED, and LACEA. These invitations reflect the academic community's recognition of the rigor, originality, and relevance of my research.

I am recognized as a leader in my field, a distinction underscored by my recent invitation to join the National Bureau of Economic Research (NBER) as a Faculty Research Fellow. My leadership is also reflected in institutional recognition, including the prestigious Connaught New Researcher Award and multiple competitive research grants.

In addition to my research accomplishments, I have taken on a range of leadership roles that strengthen academic communities. I have organized high-profile conferences, including the UTM Frontiers in Empirical Microeconomics workshop, and I have led the Applied Microeconomics seminar series at the University of Toronto, fostering intellectual exchange across fields and disciplines. I also served as a head of the graduate student committee, mentoring students and coordinating professional development initiatives. Through these roles, I contribute to shaping the research environment within and beyond my institution, while supporting the next generation of scholars.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: GO LIM, LAURENCE ANTHONY
Referencia: RYC2025-055972-I
Correo Electrónico: laurence.go@uab.cat
Título: Political Economy of Migration

Resumen de la Memoria:

During the five-year grant period, I plan to expand my research agenda to address critical questions at the intersection of migration, political economy, and labor markets in developing countries. The research objectives are structured around three broad themes:

1. Advancing Research on Migrant Enfranchisement and Selection

In contrast to existing literature studying the causes of migrant enfranchisement, I aim to study its consequences. An ongoing project, “Voting Without Borders: Effects of Migrant Enfranchisement on Democratic Perceptions” (with Dean Dulay), evaluates how the decision of governments to enfranchise their diaspora shapes democratic perception towards these states.

In studies of migration, a critical issue is that of migrant selection. While most studies in economics employ IV strategies to address selection bias, no study has sought to understand the actual sources of such selection. To fill this gap, I am conducting research unpacking migrant selection by harmonizing censuses from various countries and decades to analyze the demographic, educational, and economic characteristics of migrants.

2. Exploring Broader Immigration Themes

This research agenda goes beyond migrant voting to explore the interplay between host country institutions and immigrant outcomes. Projects under this theme include: (a) “Pride and Prejudice: Impact of National Days on Patriotism and Attitudes Toward Immigrants” (with Nicolas Fliess) investigates how national day celebrations shape perceptions toward immigrants and foster either social cohesion or exclusion; (b) “Migrant Workers and Labor Institutions in Spain” (with Suresh Naidu, Rubén Pérez Sanz, and Shing-Yi Wang) analyzes how collective bargaining agreements affect immigrant welfare and migration decisions; (c) “Economic Nationalism and Industrial Development: Evidence from the 1975 Naturalization Law” (with Jonas Hjort) examines how citizenship policies impact immigrant incorporation, firm creation, and industrial growth.

3. Integrating Social Networks in Political Economy and Labor

This line of research delves into the role of social networks in shaping political and economic outcomes. Projects in this area include: (a) “Budget Allocation and Politician Networks” (with AJ Montesa) explores the influence of social networks on increased budget allocation to politicians’ home districts; (b) “How are Minimum Wages Determined?” (with Jonas Hjort) examines the causes of minimum wage decisions, focusing on the role of networks within regional wage boards; (c) “Reducción and Long-Run Development” (with Pau Costa and André Gröger) investigates the networks between church and state and their long-term impact on development.

This research agenda represents a significant evolution from my previous trajectory, expanding beyond the political behavior of migrants to include broader themes of migrant selection, immigrant perception and welfare, and social networks. The main impact lies in generating actionable insights into how migration, social networks, and institutional policies interact to influence economic, social, and political outcomes. By tackling these underexplored areas, this research contributes to bridging critical gaps in the literature while addressing contemporary policy challenges.

Resumen del Currículum Vitae:

I am currently a postdoctoral researcher of the ERC-funded project ACCESS at UiO. I obtained my PhD in Applied Economics from the Wharton School, University of Pennsylvania. My dissertation explored how institutional constraints influence political behaviour and in turn how political networks shape development outcomes, with findings published in leading journals such as the Journal of Public Economics and Comparative Political Studies.

Building on this foundation, I have broadened my research agenda to include labour and migration as part of the ERC-funded project MIGRADEMO. In “Political Interdependence” (conditionally accepted, JEEA), we demonstrate how host country elections significantly increase emigrant turnout in homeland elections. Another study, “Absence Makes the Vote Grow Farther” (R&R, AJPS), examines how exposure to democratic institutions in host countries impacts emigrants’ political preferences. These projects leverage the Emigrant Voting Patterns dataset, the first and largest of its kind, which I helped develop. This publicly available dataset represents a substantial contribution to the study of transnational politics.

In 2026, I will be leading my largest independent project to date, funded by the AXA Research Fund, IMPACT, which examines how migration shapes and is reshaped by (1) labour institutions that govern economic inclusion and redistribution, (2) national identity-building practices that influence social cohesion and public attitudes, and (3) citizenship regimes that determine legal belonging and economic rights.

The first project, together with international and external collaborators Shing-Yi Wang (Wharton), Suresh Naidu (Columbia), and Rubén Pérez-Sanz (UB), examines how firm-level collective bargaining agreements (CBAs) affect migrant welfare and migration decisions and, conversely, how the presence of migrants influences CBA negotiations.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

The second project ([Pride & Prejudice](#)), with Nicolas Fliess (Max Planck), analyses how national days shape patriotic sentiment and attitudes toward immigrants. Combining cross-national survey data with event-study methods, we assess whether these state rituals foster social cohesion or reinforce exclusion, especially in ethnically diverse societies.

The third project, developed during my PhD and now funded through the ERC at UiO, studies the impacts of economic nationalism through the incorporation of Chinese immigrants in the Philippines as citizens. With Jonas Hjort (UCL and UiO), I examine how mass naturalization affected firm dynamics, industrial growth, and broader economic development. To advance this agenda, we work with the Philippine Statistics Authority and Securities and Exchange Commission to make historical censuses and data on the universe of Philippine firms accessible to researchers and policymakers. This data provides the groundwork for further studies which will fuel this agenda in the coming years.

Beyond this, my research pipeline spans a wide range of ongoing projects, including work on the impact of elections on political interest ([Inattentive Citizens](#), R&R, JDE), the causes and consequences of minimum wage policy, and the interplay between incumbency advantage and rank effects ([The Incumbency Advantage is Overestimated](#)).

Overall, I aim to generate impact-driven research that bridges academic inquiry and practical policymaking.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: ROBLES JIMÉNEZ, FRANCISCO JAVIER
Referencia: RYC2025-056252-I
Correo Electrónico: frobles@ub.edu
Título: Allocations and Competition in Organizations and Markets

Resumen de la Memoria:

My research trajectory is centred on microeconomic theory and game theory, with a focus on how resources and surplus should be allocated when agents behave strategically over indivisible goods. Since my PhD at the University of Barcelona, funded by an FPU grant, I have pursued a clear agenda on allocation problems, but I plan to extend to two more lines of research: coalition formation and competition economics.

As of today, I have 5 scientific papers in well-known journals in economic theory, one of them is in press and there is one manuscript under review in Games and Economic Behaviour.

A core contribution is a co-authored paper, in which I am the corresponding author, in the Journal of Economic Theory on valuation monotonicity, fairness and stability in assignment problems. We show how axioms that relate changes in agents' monetary valuations to final allocations restrict admissible rules and lead to outcomes that are stable and fair, providing foundations for assignment mechanisms with money and linking classical stability notions in matching and market design to normative requirements. Complementary papers in Social Choice and Welfare and the Journal of Mathematical Economics study package allocation with strategic bidding and mechanisms that implement Vickrey-type outcomes, identifying when allocation rules are robust to overbidding, underbidding and other simple manipulations. Earlier work on assignment markets with multi-unit demands explores how core and competitive-equilibrium concepts interact in markets with indivisible goods.

My trajectory combines international mobility and exposure to applied environments. Research stays in the United States and the Netherlands generated collaborations that led to publications, and a Visiting Professor position at Universidad Carlos III de Madrid strengthened my teaching profile and research network.

My current activity combines competitive research projects and leadership in knowledge transfer. I am co-responsible for tasks in the national project "Problemas de distribución en juegos coalicionales, redes y mercados" (PID2023-150472NB-I00), focused on assignment markets and allocation of indivisible objects, and I am principal investigator of a consultancy contract with a private company on competition economics.

The Ramón y Cajal fellowship would allow me to consolidate and expand this trajectory along three connected lines. First, I will deepen the analysis of fair and stable allocation mechanisms under strategic behaviour in markets with indivisibilities, revisiting the tension between stability and marginalism and designing transparent matching mechanisms with transfers under limited commitment. Second, I will study coalition and team formation in organizations, modelling project assignment with team production and partial coordination. Third, I will develop a line in competition economics and private enforcement, using game-theoretic models to analyse how communication and information-sharing affect incentives to bring and settle damages actions after anticompetitive practices.

Resumen del Currículum Vitae:

I am an economist specialized in microeconomic theory, game theory and normative economics. My research studies how resources and surplus should be allocated in markets and organizations when agents behave strategically, with particular emphasis on fairness and stability. I focus on the analysis and design of allocation mechanisms in markets and assignment problems with indivisible goods. An additional research interest of mine is competition economics.

I hold a Licenciatura in Economics from the Universidad Autónoma de Nayarit (2009), a Master in Economics (2011) and a PhD in Economics (2017) from the University of Barcelona, funded by a competitive FPU grant from the Spanish Government (FPU12/02914). I am currently a Serra Hùnter lecturer at the Departament de Matemàtica Econòmica, Financera i Actuarial of the University of Barcelona and have obtained lecturer accreditation from AQU Catalunya.

Since my PhD, I have authored five scientific articles as corresponding author in leading journals in microeconomic theory, including Journal of Economic Theory, Journal of Mathematical Economics, Social Choice and Welfare and International Journal of Economic Theory. I have presented my research in more than fifteen international conferences and workshops, such as the World Congress of the Game Theory Society, the Meeting of the Society for Social Choice and Welfare, and specialised workshops on game theory and market design. I was selected to attend highly competitive summer schools such as the 28th Jerusalem School in Economic Theory (Mechanism Design) and the São Paulo School of Advanced Sciences.

My trajectory shows a sustained pattern of international mobility. I have worked and/or conducted research in seven institutions and companies across four countries. Key experiences include a three-month FPU-funded visit to Brown University (USA) under the supervision of Prof. Roberto Serrano, research stays at VU University Amsterdam and Maastricht University (supported by a COST Action grant), a Visiting Professor position at Universidad Carlos III de Madrid, and applied work in competition and regulation at NERA Economic Consulting and ABC Economics in Germany. These stays shaped my agenda on assignment markets and reinforced the practical relevance of my research.

I participate in several competitive research projects on allocation problems, rationing, networks and cooperative solutions, including the national project "Problemas de distribución en juegos coalicionales, redes y mercados" (PID2023-150472NB-I00), where I am co-responsible for a substantial



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

part of the work packages. I am a member of the consolidated group "Teoria de Jocs i Mercats d'Assignació" and of the Barcelona Economic Analysis Team. In parallel, I lead a consultancy and knowledge-transfer contract on competition and economic regulation at the University of Barcelona. As of today, I co-supervise one PhD thesis and have supervised four master's dissertations and four bachelor's theses.

Overall, my career combines rigorous theoretical research, international academic experience, applied work in economic consulting and a strong commitment to teaching and the transfer of knowledge to society



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: URIZ UHARTE, GUILLERMO
Referencia: RYC2025-055879-I
Correo Electrónico: guillermo.uriz@mcp.es
Título: Firms, Networks, and Environmental Sustainability: Insights from Microeconomic Research on Markets and Policies

Resumen de la Memoria:

My main interests are in Applied Microeconomics, primarily in the fields of Industrial Organization, Economics of Digitization, Environmental Economics, and Social Networks. Key contributions include two publications in leading journals: a study on the impact of information-sharing programs on SME performance (Journal of Political Economy, 2025), and an analysis of the Madrid Central driving restriction policy, highlighting its effects on congestion, pollution, and economic activity (Journal of the European Economic Association, 2023). Additional working papers explore firm market power in input and labor markets, the design municipal waste-collection tenders in the presence of multiple frictions, and the role of ICT adoption in fostering innovation and productivity within firms. Collaborations with institutions like BBVA Data & Analytics and the Secretaria da Fazenda of São Paulo have further enriched my research, supported by competitive funding from prestigious institutions including BBVA Foundation (2016-2019), Bank Sabadell (2017), and the Spanish Ministry of Science, Innovation, and Universities (2019-2021, 2022-2026, and 2023-2027).

Building on this foundation, my future research will expand into four key areas. First, I aim to analyze the interplay between upstream and downstream firm market power, using business-to-business transactions data to develop a network model that quantifies market inefficiencies and evaluates potential policy interventions. Second, I plan to study the dynamic evolution of firms over their lifecycle, focusing on changes in their product scope, input use, labor composition, and market power to uncover the mechanisms driving growth and resilience, particularly in developing economies. Third, I will investigate waste sorting behaviors in citizens and firms, leveraging personalized participation data and implementing RCTs to identify effective behavioral interventions and policies that promote participation in waste sorting. Finally, I seek to contribute to the economics of circular resource management by examining Extended Producer Responsibility frameworks and barriers to developing robust markets for recycled raw materials, offering insights to enhance sustainability and market efficiency.

My research bridges theoretical rigor with practical relevance, addressing pressing issues in environmental policy, market dynamics, and firm behavior. These efforts aim to generate actionable insights for policymakers, businesses, and institutions working towards a more efficient, sustainable and equitable economy.

Resumen del Currículum Vitae:

I completed my PhD in Economics at University College London in December 2020, under the supervision of Professors Imran Rasul and Aureo de Paula. As a skilled microeconomist, my work lies at the intersection of Applied Econometrics and Industrial Organization, combining rigorous quantitative methods with a focus on real-world economic applications. Following my PhD, I have contributed to organizations in both the private and public sectors while maintaining a strong connection to academia. From February 2021 to October 2022, I worked for Compass Lexecon, a leading international economic consulting firm. Currently, I lead a project on the digitization and modernization of waste management services at Servicios de la Comarca de Pamplona S.A..

Two key projects from my research stand out, both published in leading journals. First, Galdon-Sanchez et al. (2025), published in the Journal of Political Economy, examines how access to market information affects the performance of small and medium-sized enterprises. Second, Galdon-Sanchez et al. (2023), published in the Journal of the European Economic Association, analyzes the effects of Madrid Central, a driving restriction policy implemented in the city center of Madrid, on traffic congestion, air pollution, and economic activity. Throughout my research, I have collaborated with coauthors from leading academic institutions, partnered with public and private organizations such as BBVA Data & Analytics and the Secretaria da Fazenda of São Paulo, and served as a research scholar at the IFS and CEMMAP research centers. This ambitious research agenda was supported by competitive grants from prestigious institutions, funding both my PhD studies (La Caixa, ESRC, and Club Financiero Español City of London) and my research projects (BBVA Foundation, the Spanish Ministry of Science, Innovation, and Universities, as well as Bank Sabadell, where I served as Principal Investigator).

Beyond academia, I have applied my expertise in both private and public sectors to deliver impactful solutions. At Compass Lexecon (2021-2022), my work focused on applying econometric techniques to antitrust and competition policy cases across various markets, including public procurement auctions, tender processes in the automotive industry, and energy markets. Since 2022, I have been leading strategic initiatives at Servicios de la Comarca de Pamplona S.A.. As Head of Planning and Control, I oversee the modernization of waste management services, including digitizing operations, designing regulations, tendering large-scale contracts, and implementing incentive systems to encourage waste separation.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: SERRANO ALARCON, MANUEL
Referencia: RYC2025-055091-I
Correo Electrónico: manuel.msal@gmail.com
Título: Population Ageing, Healthcare Costs and Welfare Spending: Evidence from European Administrative Data for Evidence-Based Policies

Resumen de la Memoria:

My scientific trajectory focuses on the quantitative analysis of the interactions between ageing, labour markets and health, combining large-scale administrative data with advanced econometric methods. I have built an independent research agenda addressing central policy questions for ageing societies: how demographic ageing influences healthcare expenditure and the sustainability of welfare systems, how long-term care provision interacts with healthcare utilisation; how increases in retirement age shape workers health; and how social protection programmes affect workers' health and labour outcomes.

I have published in leading international journals in health economics, labour economics, public policy and political science (Journal of Health Economics, Journal of Population Economics, Health Economics (x2), Health Policy, Social Science & Medicine and British Journal of Political Science. All Q1 in JCR). My work has received competitive recognition, including the Best Health Economics Article Award (AES, 2023) and the Best Paper by a Young Researcher Award (Fedea and AES, 2021). Several studies have informed national and European policy debates. My scientific contributions emphasize rigorous causal identification strategies using administrative microdata to inform both the frontier of academic knowledge and the public policy debate.

I have led or co-led projects evaluating pension reforms, long-term care programmes, and healthcare management interventions within several international research teams. Some of these projects have been founded by several relevant institutions such as the Spanish Economy Ministry, the European Commission, several private foundations and the Italian Social Security (INPS). Within these projects I have been either an active research member or a principal investigator (e.g. at INPS), showing my ability to develop both independent research ideas and work in collaborative groups formed by researchers across different countries. I have held research and teaching positions at top European institutions such as Bocconi University, Pompeu Fabra University, and Nova University of Lisbon. There, I have taught courses on health econometrics, research design and public economics at undergraduate, masters, and PhD levels. I have also participated in several PhD and master thesis defense committees.

Beyond scientific publications, I have contributed to society through applied research for public institutions. At the European Commission's Joint Research Centre, I have led the Center of Research on Impact Evaluation (CRIE) a group of 5 PhD economist who support the European Commission providing research on microeconomic causal evaluation of social policies. There, I have authored policy reports on labour market programmes, health indicators and social protection, contributing directly to evidence-based policymaking at EU level and across different European Member States. I have collaborated with the World Health Organization, Catalan Government, Italian Social Security Institute (INPS), Portuguese Ministry of Health, producing analyses that informed the design of long-term care systems, pension reforms and public health policies. My research has been disseminated through media (e.g: eldiario.es, infolibre.es, Nada es Gratis, publico.pt, rtp.pt) and European policy forums.

Resumen del Currículum Vitae:

My research trajectory has widely focus on understanding how demographic ageing shapes healthcare systems, labour markets, and social protection structures, and more generally on the causal evaluation of the effects of social and health policies. Using large-scale administrative data and rigorous causal inference methods, my work analyses the mechanisms through which ageing affects healthcare expenditure, workforce health, long-term care demand, and the effectiveness of public social and health policies. This agenda places me at the intersection of Health Economics, Labour Economics and Public Economics, with a focus on providing actionable evidence for policymakers in ageing societies.

I have developed an independent and coherent line of research through publications in leading international journals (Journal of Health Economics, Health Economics (x2), Journal of Population Economics, Health Policy, Social Science & Medicine, British Journal of Political Science). My contributions include: the first causal evidence that long-term care benefits reduce avoidable hospital use; robust causal estimates showing that abrupt increases in retirement age lead to deterioration in workers' health and higher healthcare and disability spending; and early causal evidence on the negative mental health effects of COVID-19 lockdowns. My work is widely cited (420 citations in 6 years, h-index: 9 in Google Scholar), has received awards from AES and Fedea, and has informed debates in Spain, Italy, Portugal and EU institutions.

Building on this trajectory, my research proposal aims to produce rigorous causal evidence on the multidimensional consequences of population ageing and on policy tools capable of containing rising healthcare and welfare expenditure. By combining administrative microdata from different European countries with advanced econometric methodologies, the project will address fundamental questions relevant to the sustainability and equity of welfare states facing unprecedented demographic pressures.

The programme includes four integrated work packages. WP1 estimates the causal effect of demographic ageing on healthcare spending using novel Bartik-IV strategies and develops projection tools for medium- and long-term planning. WP2 analyses how ageing affects workforce health and sickness absence, evaluates spillovers within firms, and tests policies such as sick-pay design and preventive vaccination. WP3 exploits quasi-experimental variation in long-term care supply to identify how different care arrangements affect wellbeing and healthcare utilisation. WP4 conducts two



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

nationwide RCTs in Lithuania to evaluate whether expanding the role of pharmacists in chronic care management improves adherence, strengthens collaboration between doctors, pharmacists and patients, and reduces healthcare expenditure.

Together, these work packages provide a unified empirical framework to understand the consequences of population ageing and design evidence-based interventions to ensure the sustainability of healthcare systems, welfare systems and labour markets.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: GARCÍA POLA, BERNARDO
Referencia: RYC2025-055472-I
Correo Electrónico: bernardo.garciapola@gmail.com
Título: Designing Behavioral Economics Mechanisms
Resumen de la Memoria:

In my research journey since obtaining my Ph.D. in Behavioral Economics and Game Theory, I've made notable contributions through scientific publications, focusing on behavioral and experimental economics. My work has been recognized through national and international grants, including a prestigious Discovery Project by the Australian Research Council, which I co-led as PI. I've applied my research in practical settings, notably in market design for Australia's Clean Energy Regulator. Additionally, I've actively disseminated my work through seminars, conferences, and my successful YouTube channel, Think Twice Show, which focuses on economic education.

The proposed line of research synthesizes my accumulated experience and knowledge gained throughout my career. This includes my PhD in Behavioral Economics and Game Theory, which serves as the essential cornerstone for the project. Additionally, the Gender and Competition Economics learned at the University of the Basque Country under the supervision of Nagore Iriberry and my expertise in Mechanism Design, both acquired and applied at the AGORA Centre for Market Design, are critical components of the development of the research described in the "Memoria."

My research primarily focuses on a well-known issue in academic literature: the inefficiency of selection mechanisms used by institutions for job or position allocation. These systems, known in game theory as tournaments, have two main problems. Firstly, they are inefficient because individuals who are averse to competition underperform in these settings, leading to suboptimal selections. Secondly, they present an equity issue, as this competitive aversion disproportionately affects certain groups, notably women, who tend to be more averse to competition and risk compared to men.

My interdisciplinary approach is geared towards creating unbiased selection mechanisms that reveal the best performers, irrespective of their competitiveness. The core of my proposal involves designing new mechanisms that consider behavioral biases and tendencies observed in various studies, thus creating a "de-biased" tournament. These mechanisms will incorporate features like social preferences or same-gender competitions, combined with game-theoretical aspects like multi-stage or group tournaments. The effectiveness of these mechanisms will be measured through an efficiency coefficient, assessing the alignment of top performers in a non-competitive setting with those selected by the new mechanisms. Another key metric will be an equality coefficient, evaluating the representation of diverse groups, such as women, under these mechanisms.

The ultimate goal of my research is to offer institutions improved selection processes that enhance efficiency and fairness. This innovative approach has the potential to transform selection processes in academia, labor markets, and other areas. The new mechanisms are designed to be scalable and applicable in various contexts, maintaining performance-based evaluation while addressing biases in traditional competitive settings. The impact of this research is expected to be significant, influencing scientific, economic, and societal domains by promoting fairness, reducing gender gaps, and improving decision-making processes in organizations.

Resumen del Currículum Vitae:

I obtained a degree in Business Administration (2013) and a degree in Economics (2014) from the Universidad de Oviedo. During those studies, I visited the University of Economics of Katowice for one year with an Erasmus scholarship (2012-2013) and the London School of Economics for an Environmental Economics course in their summer school (2012). After finishing my undergraduate studies, I completed my master's studies within the International Master of Economics, which takes part in three Universities: Universidad del País Vasco, Universidad de Cantabria, and Universidad de Oviedo. After that, I continued with Ph.D. studies in Economics at the Universidad del País Vasco under the joint supervision of Professor Nagore Iriberry and Jaromir Kovarik. I obtained the title "Doctor Internacional" (Cum Laude mention) in 2018. During my PhD, I visited the Ohio State University (United States of America) for almost four months, hosted by Professor Paul J. Healy.

After obtaining my PhD, I stayed at the Universidad del País Vasco as a postdoc for almost a year, until 2019 when I joined the AGORA Centre for Market Design in the Department of Economics of the Business School at the University of New South Wales (Australia) as a Postdoctoral researcher supervised by Jacob K. Goeree. I stayed until the 1st of February of 2023, when I joined the Department of Economics of the Universidad Pública de Navarra. I specialized in the areas of behavioral game theory, experimental economics, and mechanism design. I study how people behave in strategic situations, starting with a theoretical analysis that gets tested by an experimental approach.

I have participated in several research projects funded by national as well as international organizations and obtained contracts and grants for my research (PIC and FPI). So far, my research career has produced a few high-impact publications that I list below:

② García-Pola, B., Iriberry, N., & Kováčik, J. (2020). Non-equilibrium play in centipede games. *Games and Economic Behavior*, 120, 391-433.

② García-Pola, B., Iriberry, N., & Kováčik, J. (2020). Hot versus cold behavior in centipede games. *Journal of the Economic Science Association*, 6(2), 226-238.

② García-Pola, B. (2020). Do people minimize regret in strategic situations? A level-k comparison. *Games and Economic Behavior*, 124, 82-104.

I also have one Accepted under Minor Review paper at Games and Economic Behavior, and another paper in Revise & Resubmit at the Journal of Political Economy Microeconomics (all available at <https://bernardogarciapola.com/>). I have collaborated with the government of Australia, providing Market Design advice for the Clean Energy Regulator with the AGORA Centre for Market Design.

I have been a speaker at numerous national and international scientific events. I also have large experience and a prolific career in science and economics communication and outreach. I have an active science and economics outreach YouTube channel with over 3 million views. I have been two times semifinalist in the science communication contest Famelab and selected for the University of New South Wales UNSOMNIA talks. I have participated in multitude of outreach talks, including the Fecyt Science Truck, and Instituto Cervantes in Sydney among others, as well as radio and podcast appearances, including Serendipias (La Ser) or Noosfera (La Razón) among others.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: BORRELLA MAS, MIGUEL ÁNGEL
Referencia: RYC2025-054229-I
Correo Electrónico: mborrella@unav.es
Título: Applied Microeconomics for Public Policy: Climate, Politics and Social Assistance
Resumen de la Memoria:

Scientific and technical contributions. I have published 6 peer-reviewed articles, including contributions in The Economic Journal, Journal of Public Economics and European Economic Review. My work examines heterogeneous tax pass-through, cross-border fiscal responses, political corruption, and the effects of competition on clean-technology adoption. Several articles are based on original micro-datasets and quasi-experimental strategies, and I have led the construction and public release of two replication packages. Some findings have been discussed with policy stakeholders such as the CNMC, and have received media coverage in blogs like Nada es Gratis. I have presented my research in nearly 30 conferences and seminars, including LACEA-LAMES, the European Winter Meeting of the Econometric Society (receiving two best-presentation awards), and invited talks at the Joint Research Centre and IMT Lucca. These contributions have also been recognized with two research awards.

Internationalization and mobility. I have undertaken extended research stays at the University of Bologna and Pontificia Universidad Católica de Chile, where I advanced projects, presented my work in leading Latin American conferences, and taught a graduate course on applied microeconomics. These stays strengthened my international network and led to new collaborations. I also completed a research visit at UCL during my PhD and will carry out a funded three-month stay at the University of Barcelona in 2026 to continue joint work on the Georgia social-assistance experiment. Beyond these visits, I have contributed to institutional links with Strathmore University (Kenya) and the University of Pennsylvania.

Independence and leadership. I have led a nationally funded research project as sole PI and contributed to 4 additional competitive projects with a combined budget of around €230,000, taking responsibility for their empirical design and deliverables. I supervise undergraduate and master's theses (13 TFGs and 4 TFMs), two of which led to a publication and a completed PhD thesis. I am Deputy Director of the MEF, contributing to program planning, teaching coordination, and admissions. I also participate in scientific committees, including serving as referee for the Spring Meeting of Young Economists, membership in two local organizing committees, and participation in the organizing committee of the XXI Annual Conference of the Spanish Association for Energy Economics.

Line of research to be developed. My future research agenda comprises 3 main objectives that extend and enrich my previous work. First, I will study the political consequences of Spain's LEZ mandate, analysing whether ambitious climate policies generate electoral backlash and affect policy implementation at the municipal level. Second, I will examine how heat exposure and climate vulnerability shape political preferences and polarisation across Spanish districts, combining urban morphology, environmental indicators and electoral data. Third, I will design and evaluate a new nationwide field experiment in Georgia (joint with Millán-Quijano and Terskaya) to test behavioural SMS-based nudges that improve the effectiveness of unconditional cash transfers. These 3 lines will produce high-quality empirical evidence with direct relevance for climate governance, political behaviour and social-assistance design.

Resumen del Currículum Vitae:

I completed my PhD in Economics at the University of Alicante with an FPU scholarship, obtaining the distinctions of Cum Laude and International Mention. My doctoral training included a research visit at University College London, where I strengthened my analytical and econometric skills in applied microeconomics. I am currently Profesor Contratado Doctor at the University of Navarra, hold the national accreditation for Profesor Titular (ANECA), and have obtained one research sexenio.

My research lies at the intersection of applied microeconomics, public economics, industrial organization and political economy. I employ microeconomic and quasi-experimental methods to study how firms, households and governments respond to regulatory and fiscal interventions. My research follows strong open-science standards, including public datasets and fully replicable code.

I have authored six peer-reviewed articles, including publications in The Economic Journal (2022), Journal of Public Economics (2019) and European Economic Review (2025). These papers cover tax pass-through, cross-border fiscal responses, technology adoption, corruption, fiscal federalism and social trust. My work has accumulated over 120 citations and received two Faculty Research Awards (2019, 2023), as well as coverage in academic blogs such as Nada Es Gratis.

I have presented my research in nearly 30 seminars and international conferences in Europe, Latin America, Asia and Oceania, including invited talks at the Joint Research Centre (European Commission) and IMT Lucca, and contributions to LACEA-LAMES, ESAM, EPCS, RES and the European Winter Meeting of the Econometric Society. On two occasions, I have received awards for the best presentation.

My postdoctoral experience includes a nine-month stay at the University of Bologna and a one-year stay at Pontificia Universidad Católica de Chile, where I expanded collaborations in policy evaluation and environmental regulation. I also have a planned three-month research visit at the University of Barcelona (May-July 2026) to advance work on social assistance reforms.

I have led a Ramón Areces Foundation project (2020-2023) examining tax design, market structure and firms' behavioural responses, and I have participated as a researcher in four additional nationally competitive projects, which together have secured approximately €230,000 in external funding. The Ramón Areces project generated publicly available micro-datasets and produced two key publications: one in The Economic Journal (2022)



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

and another in European Economic Review (2025). In the remaining projects, I contributed to empirical design, data work and econometric modelling on environmental regulation, social assistance and inequality.

I have supervised thirteen undergraduate theses and four master's theses, including one that led to a peer-reviewed publication and another forming part of an ongoing PhD dissertation. I serve as Deputy Director of the Master in Economics and Finance and I am responsible for the course Econometrics II: Microeconometrics since 2020. I have taught more than 1,500 hours, over 80% of them in English, including master-level teaching at Pontificia Universidad Católica de Chile. I also led a small digital-innovation initiative during the transition to online instruction, coordinating a team of four faculty members.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: LLORENS TERRAZAS, JORDI
Referencia: RYC2025-054826-I
Correo Electrónico: jordi.llorens@uc3m.es
Título: Advances in Time Series Econometrics and Machine Learning

Resumen de la Memoria:

My research lies at the intersection of econometric theory and machine learning, with a particular focus on time series forecasting. By leveraging advanced econometric methods and modern machine learning techniques, I aim to improve how we model and predict complex economic phenomena. Econometric and machine learning methods should be rooted in sound statistical grounds, since a strong statistical foundation naturally leads to the development of novel and improved methodologies.

A first key contribution is the paper on Projected Dynamic Conditional Correlations, which studies Bregman divergences and proposes a novel specification of the Dynamic Conditional Correlation (DCC) model based on projecting, rather than rescaling, the pseudo-correlation matrix onto the set of correlation matrices. This ensures well-defined conditional correlations and leads to stock portfolios with attractive risk-return characteristics. The idea originated in my MRes and became the first chapter of my PhD.

A second main contribution deals with empirical risk minimization for time series forecasting in a general framework. The main theorem establishes that the algorithm selected by empirical risk minimization achieves asymptotically optimal predictive performance within its class, even when the optimal predictor is not included and under complete model misspecification. We also characterize the optimal convergence rate. These results substantially relax the assumptions required for theoretically sound forecasting and contrast with standard quasi-maximum likelihood approaches. This was the second chapter of my PhD.

My third core contribution studies multivariate dynamic quantile forecasting from a learning-theory perspective. I derive an oracle inequality showing that the predictor minimizing the in-sample check loss achieves near-optimal out-of-sample performance even under complete misspecification. Motivated by these results, I introduce a new approach to forecasting Growth-at-Risk for panels of countries. The empirical application shows that past GDP growth plays a dominant role in shaping the full conditional distribution of future growth and that combining GARCH and quantile-VAR based approaches yields the best predictive performance. My PhD thesis, which included these three chapters, was awarded summa cum laude.

Additional work includes a book chapter on portfolio selection with many assets, reviewing and extending high-dimensional DCC models and estimation methods with an application to the S&P 100.

My current research agenda has two main objectives. The first develops Growth and Inflation at Risk (GIaR), defined as the frontier of jointly extreme outcomes of low growth and high inflation, providing a tool for joint tail-risk monitoring and stagflation probability forecasting. The second studies time series forecasting with Conditional Generative Adversarial Networks, developing theory under serial dependence and evaluating performance in realized variance forecasting and dynamic portfolio allocation. Overall, my work combines econometric theory, nonparametric learning, and empirically relevant applications to improve forecasting and risk management under realistic misspecification.

Resumen del Currículum Vitae:

Mi investigación se centra en la predicción de series temporales, econometría financiera, machine learning, finanzas empíricas y macroeconomía. He publicado en revistas académicas de primer nivel como International Journal of Forecasting, Journal of Econometrics y Journal of Business and Economic Statistics. En estos trabajos desarrollo (i) un nuevo modelo de correlaciones dinámicas proyectadas que mejora la estimación de matrices de correlación de alta dimensión y su aplicación a la selección de carteras; (ii) cotas de rendimiento no paramétricas para la minimización del riesgo empírico en series temporales, mostrando cuándo los algoritmos seleccionados por este principio son asintóticamente óptimos incluso bajo mala especificación; y (iii) garantías de predicción para modelos multivariantes de cuantiles dinámicos, que permiten obtener rendimiento casi óptimo aun cuando los modelos estén mal especificados.

En mi investigación más reciente he desarrollado el concepto de Growth and Inflation at Risk (GIaR), una generalización bivalente de las medidas de riesgo de crecimiento e inflación que permite estudiar de forma conjunta los riesgos extremos de bajo crecimiento y alta inflación, con aplicaciones a escenarios de política económica y predicción de riesgos estagflacionarios. Asimismo, contribuyo al estudio del aprendizaje automático en economía y finanzas. En un proyecto en curso analizo las propiedades de las redes generativas adversarias, una forma de IA generativa con gran potencial práctico pero todavía poco utilizada en economía, evaluando su capacidad para modelizar la distribución predictiva de series temporales financieras.

Los trabajos mencionados son fruto de colaboraciones internacionales con investigadores de prestigio como Christian Brownlees, Valentina Corradi y Mika Meitz. Esta última colaboración se desarrolló durante una estancia de investigación financiada por una beca FPI en mi etapa doctoral.

Mis aportaciones tienen una clara aplicación a problemas de gestión del riesgo macroeconómico y financiero: medición de riesgos de cola conjuntos de crecimiento e inflación, evaluación de escenarios pesimistas para la toma de decisiones en política económica y construcción de carteras de inversión con mejores rendimientos ajustados por riesgo. Estos desarrollos son especialmente relevantes para bancos, gestoras de activos, bancos centrales y autoridades macroprudenciales.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Durante mi etapa en la University of Surrey dirigí cuatro tesis de máster, supervisé a dos doctorandos, desempeñé labores docentes en grado y máster, fui organizador de seminarios, miembro de comités de selección de profesorado y examinador de tesis doctoral. Mi tesis obtuvo la calificación summa cum laude por un comité internacional, y uno de mis trabajos en solitario recibió el Premio Marcelo Reyes en Econometría de Series Temporales.

Una parte esencial de mi investigación es el desarrollo de software. He creado un paquete de R para predicción de cuantiles y actualmente dirijo el desarrollo de un paquete de R para la estimación e inferencia de modelos GlaR. Además, he desarrollado materiales docentes en Python para cursos de machine learning para economistas.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Economía
Nombre: UNDA GARCES, LUISA
Referencia: RYC2025-055300-I
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Título: Reporting Quality and Corporate Governance

Resumen de la Memoria:

The main objective of my research project is to analyze the quality, transparency, and comparability of information disclosures. It aims to provide valuable insights regarding organizational reporting, using data not only from Spain but also from other EU and international countries. The special focus of this project is on biodiversity disclosures, and on gender equality advancing knowledge in the fields of Accounting Reporting Quality; Sustainability and Social Disclosures; Diversity, Equity and Inclusion. This is also consistent with my research interests and research trajectory to date. Specifically, it builds on my research on gender diversity and gender-differences in decision making, and on my research work on sustainability and climate change firm disclosures.

My research project has two key objectives:

1. Biodiversity Disclosure Practices and Reporting Regulations.

This study is motivated by the need to understand how biodiversity disclosures and reporting practices are adequate in reflecting accountability for the impact on local habitats and species, and whether organizations discharge this accountability effectively. This research would: (1) explore the factors influencing biodiversity disclosure and accountability, (2) identify the types of information stakeholders find useful, (3) examine how reporting can serve the public interest, and (4) evaluate existing regulatory guidelines and the adoption of international frameworks, such as the Taskforce on Nature-related Financial Disclosures (TNFD), Global Reporting Initiative (GRI) and newly released standards by the International Sustainability Standards Board (ISSB).

2. Gender Pay Gap Reporting Transparency and Gender Financial Literacy Gap.

Gender pay gaps and differences in workforce participation are relevant measures of gender inequality. Despite efforts to provide equal opportunities between genders, gender pay gap differences persist (Bertrand et al., 2010; Carter et al., 2017). The gender pay gap is defined as the difference in pay between the median (mean) male and female, scaled by the median (mean) male pay. Some governments require employers to disclose information about their gender representation. In 2017, for example, the UK government enacted the Equality Act 2010 (Gender Pay Gap Information). In a similar vein, the EU Pay Transparency Directive (Directive (EU) 2023/970) requires employers: a) to disclose salary ranges for job vacancies, prohibiting pay secrecy, and b) to provide information on pay structures to employees to help close the gender pay gap. Employers with over 100 employees must report on gender pay gaps, conduct joint pay assessments if gaps exceed 5%, and ensure their job evaluations are objective and gender neutral. This directive will be implemented from mid-2026, and as such it provides an opportunity to investigate the state of the art in gender pay reporting transparency. This study would examine the effect of pay transparency regulation on the gender pay gap and on firm outcomes.

Resumen del Currículum Vitae:

I am Luisa A. Unda, Ph.D., and I currently work as an Accounting Professor at the University of the Balearic Islands (UIB) in Spain. I obtained my PhD from La Trobe University in Melbourne, Australia, in 2016. My research focuses on analyzing topics related to financial reporting quality, accounting information disclosure and transparency, corporate governance, managerial attributes and traits, sustainability and climate-change regulation, and gender and financial decision-making. My work has been published in prestigious, high-impact international academic journals such as European Accounting Review, Journal of Corporate Finance, Journal of Banking & Finance, Pacific-Basin Finance Journal, Financial Accountability and Management, among others. These publications have achieved significant scientific and social impact, as shown by citation metrics and by the use of my research to stimulate debates on policy and regulation. I have published as a sole author and with international coauthors, demonstrating my interest in building a strong research network. I have received awards such as the Emerald Best Paper Award and the Best Research Interactive Poster Award for my research. I have participated in several competitive national and international research projects, serving as principal investigator, co-principal investigator, or member, over a sustained period and with evidence of research publications. I am currently the principal investigator and leader of the consolidated research group in accounting at UIB. I am also a member of international research networks and collaborate with prestigious research centers such as the InSPIReS Centre for Responsible Science, where I serve as Vice-President for Early Career Researcher Support and as a member of the scientific-technical evaluation committee for the "pitching research" competition. This connection emerged after winning several pitching research competitions both at the university level and at the Australia-wide level.

I have more than fourteen years of teaching experience, covering undergraduate, postgraduate, and doctoral seminar courses. I have delivered lectures, practical sessions, and seminars at universities in Australia, Germany, and Spain. I have taught a wide range of accounting and finance subjects. I have experience preparing and developing course guides, creating new courses and teaching materials, and designing innovative assessment activities. I have supervised 12 bachelor's theses (12 ECTS), 27 research papers (6 ECTS), and 11 master's theses (24 ECTS) at the University of Mannheim. I have received teaching excellence awards, letters of commendation from university authorities, and positive evaluations from students. Regarding my leadership experience, I have served on several departmental committees, including the research committee, selection committee, research seminar organization, and teaching allocation coordination. I have led several research projects that have resulted in high-quality publications, and I have greatly enjoyed the teamwork involved. I am building relationships with public regulators and private accounting bodies by actively contributing to public consultations. I am an innate mentor, and I am committed to supporting the development and growth of early-career researchers by offering guidance and advice for a successful career.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: BAIUTTI BAIUTTI, FEDERICO
Referencia: RYC2025-055432-I
Correo Electrónico: federico.baiutti@gmail.com
Título: New-generation solid state energy devices via naoengineering

Resumen de la Memoria:

My research trajectory is centred on the development of advanced materials, nanostructures and devices that can overcome the long-standing limitations of solid-state energy technologies.

My main contributions have advanced three interconnected areas. First, I have developed new classes of energy-conversion devices based on functional nanostructures specifically designed to improve the activity, stability and manufacturability. These structures includes, for example, self-generated nanocomposites, grain-boundary-engineered materials and mesoporous electrode supports, which have demonstrated superior oxygen kinetics, enhanced durability and compatibility with commercial devices. These advances have directly influenced the design of state-of-the-art solid oxide cell electrodes and have been validated from the lab to large-area, industrially relevant components.

Second, I have pioneered disruptive energy-storage concepts based on non-lithium solid-state chemistries. My co-invention of oxygen-ion batteries represents a new paradigm in solid-state storage, offering high stability, full solid-state operation and reduced dependence on critical raw materials. This concept has progressed from laboratory demonstration to industrial scale-up and pre-commercial validation through the EIC Transition project *OxyBatt*, which I coordinate. In parallel, I have contributed to emerging proton-based storage and conversion schemes, exploring reversible proton storage and developing new architectures for PEMs and low temperature electrolysis.

A third core element of my research line is the development of advanced methodologies that reveal the fundamental processes governing electrochemical devices. I have introduced or helped establish advanced tools such as isotope-exchange atom probe tomography (IE-APT), operando Raman spectroscopy (IERS) and iono-optic impedance spectroscopy (I-OIS). These techniques provide insights into ion transport paths, redox dynamics and degradation mechanisms with nanometric and even sub-nanometric resolution. They have enabled a new approach to understanding solid-state electrochemistry, where local structure, chemistry and transport can be directly correlated, informing the rational design of more reliable devices.

Building on these contributions, my current research line focuses on three strategic axes: (i) post-lithium solid-state batteries based on oxygen and proton transport, (ii) scalable thin-film materials and device integration for hydrogen technologies, and (iii) operando nanoionics for real-time monitoring of functional materials and full devices. These topics address key challenges for Europe's energy transition, including material sustainability, device longevity, hydrogen integration and the development of safe, high-performance storage technologies.

Resumen del Currículum Vitae:

I completed my PhD at the Max-Planck Institute for Solid State Research and University of Stuttgart (Germany), receiving training in thin-film growth and solid-state chemistry. During my doctoral studies I carried out a research stay at Brookhaven National Laboratory (USA), where I expanded my expertise in functional materials nanoengineering via thin-film approaches. Following my PhD (2015), I continued at Max-Planck as a postdoctoral researcher before joining IREC (Spain) in 2016, where I built a strong expertise on electrochemical devices for energy, including hydrogen technologies (solid oxide cells) and batteries. In 2018 I was a visiting scientist at the University of Cambridge (UK). From 2020 to 2024 I carried out a Marie Skłodowska-Curie Individual Fellowship at the National Institute of Chemistry (Slovenia), broadening my knowledge in the field of low-temperature electrocatalysis and polymeric electrolyte membranes (PEMs). During this period I maintained my research activity at IREC, contributing to European projects and consolidating an independent research profile.

Throughout my career I have participated in numerous competitive research projects. I am currently PI of the EIC Transition project *OxyBatt* and the national project *PowerDot*. I have coordinated work packages and key tasks in European consortia including several EU-funded FET projects, and I have participated in technology-transfer collaborations with companies in the fields of SOC manufacturing (SolydEra), industrial IoT (AEInnova, WorldSensing), development of advanced lab instrumentation (Horiba Scientific) and coatings (Nano4Energy). My ERC Consolidator Grant proposal (2025) reached the final interview stage with a top evaluation grade, and an EIC Pathfinder project in which I acted as Work Package leader received a Seal of Excellence.

My scientific production includes publications in leading international journals in materials science and energy technologies, contributions to international conferences (including keynote and invited talks) and participation in the editing and reviewing processes of high-impact journals. I have co-invented three patents, related to novel battery technologies and thin-film devices.

I have supervised three PhD theses and three undergraduate projects, and I currently lead a team of three PhD candidates working under my independent supervision. I regularly participate in teaching activities for undergraduate and graduate students and contribute to the evaluation of national and international research proposals.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: KHAN, MALIK DILSHAD
Referencia: RYC2025-057282-I
Correo Electrónico: mdkhan@irec.cat
Título: Biomass Valorization-Driven Low-Voltage Hydrogen Production (VALOR-H2)

Resumen de la Memoria:

I will develop an integrated platform that couples hydrogen production with biomass valorization by replacing the energy-intensive oxygen evolution reaction (OER) with the selective electro-oxidation of biomass-derived small organic molecules. Using molecular-precursor-engineered catalysts, including chiral metal chalcogenides and high-entropy compositions, combined with operando spectroscopy and flow-cell integration, the project aims to demonstrate low-voltage hydrogen generation alongside the selective conversion of platform molecules (e.g., 5-hydroxymethylfurfural (HMF) into 2,5-furandicarboxylic acid (FDCA)). This programme unites catalyst discovery, mechanistic understanding, reactor development, and techno-economic analysis to deliver validated demonstrators and a clear pathway toward future IP and industrial uptake.

Background and context: Electrochemical hydrogen production is central to global decarbonization strategies, yet its large-scale deployment remains limited by the inefficiency of the anodic oxygen evolution reaction (OER). OER is kinetically sluggish, requires high overpotentials, and contributes up to 70% of the total energy cost of water electrolysis. As a result, the overall process remains energetically and economically constrained, especially when operated at industrially relevant current densities. Addressing the anodic bottleneck is therefore essential for enabling truly low-cost, green hydrogen.

In recent years, a promising alternative has emerged: replacing OER with the selective electro-oxidation of biomass-derived small organic molecules. Compounds such as HMF, glycerol, ethanol, ethylene glycol, and other platform intermediates can be oxidized at significantly lower potentials than OER, enabling substantially reduced cell voltages for hydrogen production. This approach simultaneously generates value-added products (e.g., FDCA from HMF, glycerate from glycerol), creating a dual-benefit system where hydrogen production is coupled to sustainable biomass valorization. However, despite its conceptual attractiveness, the field remains technologically immature: most reported systems lack long-term stability, mechanistic understanding, or integration into flow-reactor architectures.

A second challenge lies in the design of selective, durable, and bias-efficient electrocatalysts capable of suppressing unwanted C-C cleavage, enabling preferential oxidation pathways, and maintaining activity under continuous operating conditions. Traditional catalyst development approaches, largely empirical, offer limited control over active-site chemistry. In contrast, molecular-precursor routes (a field in which I have significant expertise) allow atomic-level control over composition, doping, defect density, and nanoscale structure. In particular, (chiral) metal chalcogenides, high-entropy materials, and molecularly engineered solid solutions offer tunable oxidation kinetics, improved stability, and unique surface intermediates relevant to biomass electro-oxidation. Yet their potential in paired hydrogen-biomass systems is largely unexplored. Most studies report isolated laboratory-scale reactions without considering mass transport, reaction kinetics, and scale-up feasibility. There is a lack of comprehensive techno-economic assessments linking catalyst design, substrate conversion efficiency, and potential industrial valorization

Resumen del Currículum Vitae:

I have established a strong international research profile in energy materials, with 80 peer-reviewed publications (including 20 as corresponding author), 7 book chapters, an H-index of 32, and over 2,380 citations (Google Scholar) thus far. I demonstrated scientific leadership through the training of early-career researchers, including supervision of 4 PhD graduates and two PhD students currently in progress, and through my involvement in prestigious MSCA programmes, including an ongoing MSCA Postdoctoral Fellowship and previous participation in an MSCA COFUND programme (PD2PI).

My research excellence has been recognized through multiple competitive grants in South Africa, UK, Poland, and Spain, my status as a NRF-Rated Researcher in South Africa, and a nomination for the Raikes Medal, one of the country's highest scientific distinctions for researchers under 40 years. I also contribute to the field as an Editor of the RSC "SPR Nanosciences" book series (volume 7 onwards, currently at vol 11).

My career includes the development of advanced materials and experimental methodologies, collaborations with industry and international researchers. I have delivered multiple keynote and invited lectures, alongside extensive dissemination efforts through workshops and conferences.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: CAPELLÁN PÉREZ, IÑIGO
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Correo Electrónico: inigo.capellan@uva.es
Título: modelling and simulation of sustainable energy systems

Resumen de la Memoria:

Mi carrera investigadora está dedicada al análisis de las vías hacia la sostenibilidad energética mediante un enfoque de modelado integrado de sistemas, una perspectiva que se nutre de mi formación multidisciplinar en Ingeniería Industrial Energética y Economía. Desde 2010, mi trabajo se ha desarrollado en el seno del Grupo de Energía, Economía y Dinámica de Sistemas de la Universidad de Valladolid (GEEDS-UVA), un grupo de referencia en el que me formé y al que regresé tras periodos de gran enriquecimiento en otros centros. Durante mi tesis doctoral fui miembro del grupo "Low Carbon" en el Basque Centre for Climate Change (BC3), donde me familiaricé con entornos y proyectos de investigación internacional. Un primer postdoctorado en el ICM-CSIC dentro del proyecto H2020 MEDEAS consolidó mi experiencia en el ámbito europeo. Posteriormente, he desarrollado mi carrera en GEEDS-UVA con contratos Juan de la Cierva-Formación (2017-2019) y Juan de la Cierva-Incorporación (2022-2025).

Mi línea de investigación principal consiste en analizar las transiciones energéticas sostenibles a través del modelado de sistemas integrados. Mi experiencia abarca toda la cadena de transformación energética, desde el estudio de las restricciones de recursos (geología, materiales, energía neta/EROI) y la gestión de la variabilidad de las renovables, hasta la modelización de hidrógeno y e-combustibles y el análisis detallado de la demanda sectorial (transporte, industria, hogares). El objetivo último es evaluar de manera interconectada las dimensiones técnicas, sociales (bienestar) y ambientales (clima, suelo, contaminación) de la descarbonización. Mi trabajo ha tenido una influencia notable en renovar el interés científico por los límites biofísicos de los sistemas energéticos y en promover una evaluación crítica de la viabilidad de los diferentes modelos de transición.

Esta investigación se ha aplicado principalmente desarrollando y aplicando modelos de evaluación integrada (IAMs). Durante mi doctorado, apliqué el modelo GCAM (referente del IPCC) al análisis de la mitigación climática. Posteriormente, lideré el desarrollo del prototipo WoLiM en GEEDS-UVA, precursor de los modelos de los proyectos europeos MEDEAS y LOCOMOTION. Fui uno de los desarrolladores principales del modelo MEDEAS y, de 2020 a 2023, ejercí como Coordinador Científico del proyecto LOCOMOTION, responsable de dirigir todas las tareas técnicas para la creación del nuevo modelo WILLIAM, un rol que mantengo tras la finalización del proyecto.

Resumen del Currículum Vitae:

Mi productividad científica se refleja en un total de aproximadamente 130 contribuciones. En el ámbito de publicaciones, destaco 34 artículos en revistas indexadas en el JCR, de los cuales 19 se encuentran en el primer cuartil (Q1) y 17 en el primer decil (D1) del Journal Citation Reports, incluyendo revistas de muy alto impacto como Energy & Environmental Science. De ellos, 6 (5 en Q1/D1) son como primer autor. Mi índice h (Web of Science) es 19. También he publicado 15 capítulos de libro y he contribuido a decenas de informes científicos.

He participado activamente en la captación y ejecución de investigación competitiva, con experiencia en 11 proyectos, 8 de ellos del programa marco europeo (FP7, H2020, HORIZON), donde he co-redactado más de 30 entregables. Actualmente soy el investigador principal por la UVA en el proyecto Horizon Europe HYDRA, para integrar el sector del hidrógeno en el modelo WILLIAM, y he sido IP en dos contratos de investigación con entidades externas.

La difusión de mis resultados incluye más de 60 contribuciones a congresos internacionales (una como ponente invitado) y 11 a congresos nacionales. He organizado regularmente sesiones especiales en conferencias. Mi red de colaboración científica es extensa, con más de 80 coautores en publicaciones JCR, de los cuales más de 40 son de instituciones fuera de España. He registrado dos patentes relacionadas con los modelos desarrollados y su aplicación en gamificación.

En mi labor de evaluación y transferencia, he sido revisor habitual para revistas JCR (44 revisiones verificadas en WoS), evaluador de una tesis doctoral internacional (UCLouvain) y de un Trabajo Fin de Máster. Mi compromiso con la divulgación y el impacto social se materializa en la redacción de artículos de divulgación (The Conversation, El Ecologista), decenas de charlas públicas, apariciones en podcasts y, de manera destacada, en el desarrollo y coordinación del juego de simulación participativo Global Sustainability Crossroads, basado en los modelos MEDEAS, que utilicé como herramienta docente en varias universidades.

En el ámbito de la formación, he impartido docencia en cursos de grado y posgrado sobre sostenibilidad energética y modelado en la UVA y la EHU, y en MOOCs sobre los modelos MEDEAS y WILLIAM. Actualmente superviso 4 tesis doctorales y he dirigido 10 Trabajos Fin de Grado y Máster. Cuento con la acreditación de la ANECA (2023) para las figuras de Profesor Contratado Doctor, Ayudante Doctor y de Universidad Privada, y colaboro con el Máster Internacional SMACCS de la EHU.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: GÓMEZ MARTÍN, AURORA
Referencia: RYC2025-054490-I
Correo Electrónico: aurora.gmartin@gmail.com
Título: Design of Advanced Materials and Understanding of Degradation Mechanisms for Batteries in Electric Mobility

Resumen de la Memoria:

Dr. Aurora Gomez Martin's scientific trajectory focuses on the design, synthesis and mechanistic understanding of advanced materials for electrochemical energy storage. Her research has evolved from ceramic and biomorphic systems derived from biomass for environmental applications to the sustainable graphitisation of biomass precursors and the development of diverse high-energy battery materials, including silicon anodes, Ni-rich cathodes and sodium-ion electrodes. Throughout this progression, a central focus has been the mechanistic understanding of materials ageing, interfacial processes and degradation phenomena, together with strategies to enhance sustainability across synthesis, processing and cell operation. This multidisciplinary evolution has allowed her to integrate materials engineering, electrochemical diagnostics and mechanistic studies to address performance, durability and safety challenges in next-generation energy-storage technologies, particularly those underpinning the transition to sustainable electric transport.

She obtained her PhD in Science and Technology of New Materials at the University of Seville (2019), carried out jointly with the Institute of Materials Science of Seville (ICMS, US-CSIC). Her doctoral research on biomass-derived carbons for Li- and Na-ion batteries combined sustainable synthesis, advanced characterisation and electrochemical evaluation, and included two competitive DAAD-funded research stays at the MEET Battery Research Center (University of Münster, Germany), which broadened her expertise in ageing diagnostics and established long-term international collaborations.

Between 2020 and 2022, Gómez Martín conducted postdoctoral research at MEET, contributing to high-energy lithium-ion cells for electric vehicles. She co-led research directions on Ni-rich cathodes, water-based electrode processing and silicon prelithiation, integrating mechanistic insights with synthesis optimisation and synchrotron-based methods. This period consolidated her scientific leadership, project management experience and international visibility.

In 2023 she joined the BMW Group Battery Cell Competence Center (Munich), serving as technical lead for ageing diagnostics, failure analysis and fast-charging behaviour in large-format automotive lithium-ion cells. This role provided unique exposure to real-world degradation pathways, industrial validation processes and safety requirements, reinforcing her capacity to bridge academic research with applied engineering challenges.

Her proposed research line focuses on establishing a mechanistic framework for long-term durability in next-generation sodium-ion batteries. This includes advanced characterisation strategies, interphase engineering, electrolyte optimisation and degradation modelling. Building on her cross-disciplinary background spanning sustainable carbons, high-energy electrodes, degradation science and industrial diagnostics the programme aims to deliver robust design principles for safe, durable and resource-secure energy-storage technologies.

Resumen del Currículum Vitae:

Dr. Aurora Gómez-Martín has built a consolidated scientific profile in materials science for electrochemical energy storage, combining academic research, international mobility and industrial experience aligned with the energy and transport sectors. Her work encompasses ceramic materials for environmental applications, sustainable carbons from biomass, high-energy lithium-ion electrodes, sodium-ion anodes and advanced diagnostic approaches for understanding ageing and degradation in large-format battery cells.

She completed her BSc and MSc in Physics and her PhD in Materials Science at the University of Seville, receiving the Extraordinary Doctorate Award (2018/2019). Her doctoral research, conducted jointly with the Institute of Materials Science of Seville (ICMS, US-CSIC), focused on biomass-derived carbon materials for Li- and Na-ion batteries and included two competitive DAAD-funded research stays at the MEET Battery Research Center (University of Münster), where she strengthened her expertise in electrochemical testing, ageing diagnostics and advanced characterisation.

Between 2020 and 2022, Dr. Gómez Martín carried out postdoctoral research at MEET within an EU H2020 project developing high-energy lithium-ion cells for electric mobility. She coordinated research lines on Ni-rich layered oxides, silicon-based anodes and water-based cathode electrode processing, co-led two work packages and supervised MSc and PhD researchers. This period reinforced her experience in interdisciplinary collaboration, project management and mechanistic studies of electrode degradation and interfacial processes.

In 2023 she joined the BMW Group Battery Cell Competence Center (Munich) as technical lead for ageing diagnostics, failure analysis and fast-charging behaviour in automotive lithium-ion cells. Her work involved methodological development, coordination with production and quality departments and technical interaction with international cell suppliers, providing direct insight into validation pathways, safety requirements and real-world degradation processes in large-format cells used in electric vehicles.

Her scientific output includes 38 peer-reviewed publications (19 corresponding author), 10 journal covers, three industrially co-authored papers and one book chapter, with more than 1,680 citations (h-index 21). She has participated in twelve international conferences, receiving four presentation awards and delivering three invited talks. She has contributed to five competitive research projects across national, German and European programmes. Dr. Gómez Martín has also supervised five PhD candidates, three MSc theses and two visiting doctoral researchers.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Her track record combining high-impact publications, international experience, industrial R&D, competitive project participation and mentoring demonstrates scientific independence, research leadership and the capacity to generate technological and societal impact in fields central to sustainable energy and electric transport.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: ANVARI, SIMIN
Referencia: RYC2025-055136-I
Correo Electrónico: anvvari.simin@usal.es
Título: Circular Carbon $\rightarrow$ Hydrogen Energy Systems for Industrial Decarbonisation

Resumen de la Memoria:

My research trajectory focuses on advancing sustainable and decarbonised energy systems through the integration of solar energy, biomass conversion, hydrogen production and system-level sustainability assessment. Trained as a mechanical engineer, my early work developed hybrid solar $\rightarrow$ biomass multigeneration systems supported by energy, exergy, exergoeconomic and environmental analyses (4E). Subsequent international mobility broadened this foundation: in Thailand and China I advanced multi-objective optimisation of multigeneration systems; in Poland I incorporated life cycle assessment (LCA) to strengthen environmental assessment; and in Spain (Universities of Jaén and Salamanca) I worked on EU projects modelling real biomass $\rightarrow$ solar systems with Techno-economic (TEA) analysis and LCA for deployment in Africa and Europe.

Short research stays at the Universities of Pisa, KU Leuven and Imperial College London, and collaboration with Iberdrola, deepened my expertise in circular-material flows, CO₂ valorisation (CCUS), techno-economic risk, and industrial feasibility. These experiences shaped a mature vision of sustainability transitions that integrates renewables, carbon management, circularity and financial viability $\rightarrow$ essential elements for the proposed line. The proposed research line, Circular Carbon $\rightarrow$ Hydrogen Energy Systems (CCHES), responds to Spain's urgent need for integrated, investable decarbonisation pathways aligned with PNIEC, the EU Hydrogen Strategy and the Green Deal. Current analyses treat hydrogen, bioenergy, CCUS, circular resource use and finance in isolation. CCHES overcomes this fragmentation by developing a unified, multi-scale optimisation framework combining system modelling, exergy analysis, LCA, TEA, circular-material flow assessment and green-finance tools (carbon credits, real-options, PERTE incentives). The platform will generate investment-grade designs tailored to Spanish industrial clusters, supported by an open decision-support toolkit for policymakers and industry.

The CCHES line will deliver a step-change in Spain's industrial decarbonisation capacity by generating scientifically robust, financially viable and deployment-ready circular energy solutions. In the short term, it will establish validated digital twins and initial system configurations co-designed with industry and regional stakeholders. In the medium term, it will provide an open decision-support toolkit and investment-grade design packages enabling the launch of pilot projects in key Spanish industrial clusters. In the long term, CCHES will deliver measurable reductions in GHG emissions, enhanced material circularity and trained national expertise, positioning Spain as a European leader in circular hydrogen $\rightarrow$ bioenergy innovation.

CCHES marks a clear evolution from my previous trajectory: it moves beyond subsystem analysis to a holistic, deployment-oriented agenda integrating technical, environmental, circular and financial dimensions. This independent line, reinforced by frontier collaborations with KU Leuven, Imperial College London and Iberdrola, establishes a strong, long-term research programme capable of leading a future group in circular energy systems.

Resumen del Currículum Vitae:

My research advances circular, low-carbon, multi-generation energy systems, integrating solar, biomass, and hydrogen. I developed conceptual frameworks for system hybridization, multi-generation integration, and sustainability assessment across technical, economic, environmental, social, and policy dimensions (Renewable and Sustainable Energy Reviews, 2025, JIF 16.3). I also created a bioenergy resource assessment and policy framework for agri-food waste valorization in North Africa (Energy for Sustainable Development, 2024, JIF 7.5). I designed 4E analyses (energy, exergy, economic, environmental) and multi-objective Pareto optimization models, validated through collaborations in Spain, Belgium, Poland, Italy, Iran, Thailand, and China.

I have contributed to three EU Horizon 2020 projects as a postdoctoral researcher. My current Marie Skłodowska-Curie $\rightarrow$ Iberdrola (E4F) fellowship at University of Salamanca (USAL), focuses on sustainability assessment of hybrid solar $\rightarrow$ biomass CHP systems, including model development, methodology design, simulation validation, work package coordination, and dissemination. I also contributed to REFFECT Africa project (University of Jaén (UJA)) and Phy2Climate project (Silesian University of Technology (POLSL)), performing 4E, techno-economic, life cycle assessment (LCA), and experimental analyses to optimize renewable energy systems. I have published 27 peer-reviewed articles (16 as first author, 21 in Q1, 810 citations, h-index 14), 2 book chapters, 2 academic books, presented at international conferences, and held two patents, informing energy system design and industrial applications.

I have supervised PhD, MSc, and BSc students at Monash University, POLSL, USAL, UJA, and Urmia University, guiding work on hybrid energy systems, environmental-economic assessment, and hydrogen pathways. I have served on thesis committees, supported project-based learning, and strengthened my pedagogical skills through "Teaching Tomorrow's Tech Innovators" (DTU, 2025), positioning me to train doctoral and postdoctoral researchers under a Ramón y Cajal programme.

I review for high-impact journals (Applied Energy, Energy Conversion and Management, Renewable Energy, etc.) and received the Outstanding Reviewer Award (Applied Energy, 2018). I disseminate research widely through SolarPACES, ECOS, CISBAT, and open-access platforms. I have led international collaborations across Europe, Asia, and UK and translated research into industrial and policy applications. During my industry secondment at Iberdrola, I supported the Decarbonization Team on circular hydrogen integration, carbon capture, and low-carbon transition strategies. In REFFECT Africa, I implemented operational biomass-CHP systems in North African olive mills and developed policy-oriented sustainability frameworks. I also contribute to public engagement through European Researchers' Night, conferences, and workshops.

During my E4F fellowship, collaborations with KU Leuven and Imperial College London showed that integrating biomass residues with CCUS and hydrogen pathways enables circular, low-carbon, affordable solutions for energy-insecure regions. This shaped my vision as an independent, interdisciplinary researcher pursuing PI leadership, fostering international and industrial collaborations, training next generation, and translating research into societal impacts.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: PARRA MENDOZA, DAVID
Referencia: RYC2025-056550-I
Correo Electrónico: david.parra@ciiae.org
Título: Energy system modelling for deep decarbonisation

Resumen de la Memoria:

The proposed research line aims to develop cutting edge data-driven energy system models for various relevant scales, ranging from single homes, industrial hubs and Iberia. These models will address deep decarbonisation technologies including sector coupling, e.g., synthetic fuels and heating, as well as hard to abate sectors such as the chemical industry. The goal is to provide smart decision support for decision-makers including science, policy and industry. Various relevant disciplines such as engineering, economics and social sciences will be combined, using several research methods such as optimisation, e.g., linear and multi-objective, simulation, life-cycle assessment (LCA), and/or techno-economic assessment. Importantly, this techno-economic methods will be further combined with methods from the social sciences. This includes the use and/or elaboration of experiments such as surveys to understand key preferences of citizens towards the energy transition, e.g., to adopt low carbon technologies and/or join energy communities.

My research has so far focused on the integration of renewable energy with energy storage and hydrogen at various levels, e.g., technologies, energy systems and policies. My work is interdisciplinary incorporating technical, economic, environmental, and social dimensions, with the latter now being expanded. In terms of technologies, I have so far mainly addressed electrification with electric vehicles and heat pumps, as well as green hydrogen and synthetic methane. The proposed research line in the context of this RyC differentiates with my previous research by:

I. Addressing the decarbonisation of hard to abate sectors such as the chemical industry, with a focus on basic chemicals which can also played the role of energy vectors such as ammonia and methanol. The open models to be developed will determine both the levelised cost and levelised emissions, and also be technologically rigorous by incorporating input data from the lab and pilot demonstrations in CIIE, including both thermo-catalytic processes and novel electrochemical routes. The hydrogen and power-to-x pilot plant of CIIE includes related technologies at TRL 5-6 which will be tested in the context of Horizon 2025 projects where I am involved such as SUPREMAS and ALCHEMY.

II. Modelling new energy vectors such as hydrogen and ammonia for long-term energy storage, to provide flexibility over a temporal horizon of several days, weeks or even months (i.e. seasonal storage). Long term energy storage cannot only contribute towards decarbonisation but also towards EU energy sovereignty.

III. Using surveys to study the adoption and/or acceptance of low carbon technologies, e.g., surveys conducted by the Spanish National Statistics Institute (INE).

I aim to provide a combination of theoretical (models) informed by practical (pilot plants) knowledge which can be very useful to accelerate the energy transition.

Resumen del Currículum Vitae:

David Parra is Head of the Hydrogen and Power-to-X Department at the new Iberian centre for Research in Energy Storage (CIIE), where he is developing his own research agenda, as well as coordinating a team of around 40 researchers, covering fundamental science, modelling, prototyping, pilot plants and regulation. As part of this role, he also performs strategic development and management including many industrial collaborations with companies such as Repsol, Iberdrola and Deutz.

His research focuses on energy system analysis and energy economics, and the development and application of data-driven energy models, which are both technologically rich and economically rigorous, to decarbonize various economic sectors. His work is interdisciplinary incorporating technical, economic, environmental, and social dimensions, with the latter now being expanded. In recent years, he has led and coordinated several public competitive research projects, as PI, for around 1.6 million euros, while also being researcher in projects for around 1.7 million euros. He has published 56 scientific papers in peer-reviewed journals (with 15 papers as first author and 17 papers as last author), including top journals such as Nature Energy, Joule, Applied Energy, Energy Economics and Environmental Science and Technology. His research has been covered by the media, namely Horizons-The Swiss Research Magazine, la Tribune de Genève and Le Journal de l'UNIGE. In addition, David Parra has been invited to give keynote speakers in scientific conferences worldwide, e.g., The Netherlands, Mexico, Switzerland, and the UK.

His several research achievements include, among others, being the author of a thesis which contributed to develop the concept of Community Energy Storage and proposed a method to optimise it; he designed, constructed and successfully operated a hydrogen storage system for a low carbon community; he established a new collaboration between The Institute for Environmental Sciences of the University of Geneva (UNIGE-ISE) and the Massachusetts Institute of Technology (MIT) on renewable energy and energy storage after receiving competitive funding from the Swiss National Science Foundation (SNSF); and he wrote a focus study to inform policy makers in the Swiss Parliament (May 2017-November 2018). His mentoring and supervising experience is also ample including 4 postdoctoral researchers, 9 PhD students (5 defended and 4 under development) and 11 master students. This activity has led to 5 PhD theses, as supervisor and co-supervisor, as well as master theses and peer-review journal publications in top journals.



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DE CIENCIA, INNOVACIÓN
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

In 2010, he obtained a prestigious scholarship from the University of Nottingham (UK) to pursue his PhD, which he completed in 2014. He was subsequently appointed postdoc in 2014, and Senior Research Fellow and teaching fellow in 2016, both at the University of Geneva (Switzerland), where he coordinated a research group in Energy storage and hydrogen; as well as visiting researcher at the Massachusetts Institute of Technology (MIT, USA) in 2017. Between 2017 and 2021, he also was Principal Investigator at the Swiss Competence Center in Research in Energy Storage (SCCER-HaE, Switzerland), and he performed a techno-economic assessment for Power-to-X as part of a White paper prepared for the Swiss Federal Office of Energy.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: ZAMUDIO GARCÍA, JAVIER
Referencia: RYC2025-056757-I
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Título: Advanced functional materials for energy conversion devices

Resumen de la Memoria:

I am a chemist conducting interdisciplinary research on advanced materials design for energy conversion and storage devices. My contributions to the field of materials science and energy conversion have been recognized through 36 publications JCR journals, most of them in the first quartile (Q1), with 17 of them publications as first author. During my doctoral studies at the University of Málaga, I was focused on the development of efficient, cost-effective and durable materials for Solid Oxide Cells (SOCs), electrochemical devices that operate bidirectionally to generate and store energy in the form of hydrogen.

In my pre- and postdoctoral international period at the Technical University of Denmark (DTU, 2.5 years), I simultaneously worked on two new research lines: (i) Vertically Aligned Nanocomposite (VANs) functional oxides prepared by physical techniques for multifunctional applications and (ii) Scaling green hydrogen production technologies based on metal-supported electrolysis cells. During this period, I have been deeply involved in EU-funded projects and technology transfer to industrial partners, being responsible for refining experimental protocols, design and fabrication of custom electrochemical cells and implementing new strategies to enhance performance stability.

During the execution time of the Ramón y Cajal fellowship, I will leverage my background in applied research to deepen and advance the scientific questions that have defined my career to date. In parallel, I plan to initiate innovative research trajectories that respond to current gaps and emerging opportunities in the energy field. For this purpose, I propose two main research lines together with national and European partners:

1) Advanced electrode engineering for Low Temperature Proton Conducting Cells (LT-PC2). In the first topic, I will implement alternative fabrication processes to reduce manufacturing costs, ensuring scalability to industrial scale and improving efficiency in proton conducting electrodes. Novel approaches based on hierarchical 3D honeycomb-like architectures and the implementation of nanocomposite electrodes with oxides featuring negative thermal expansion (NTE).

2) Multifunctional VANs for energy and nanoelectronics (MULTI-VAN). In the second topic, I will exploit the unique architecture of VANs, featuring multiple vertical strained interfaces, to achieve unprecedented control over functional properties at the nanoscale. By engineering the strain, interface density, and composition in these VANs, I aim to simultaneously tailor electronic, ionic, and magnetic behaviors, opening new pathways for multifunctional energy conversion devices and next-generation of nanoelectronic applications.

The proposed new research lines strike a careful balance between risk and reward, aiming to make a relevant scientific contribution through innovative research, inspiring new directions in the field of energy conversion devices.

Resumen del Currículum Vitae:

BsC in Chemistry (2017, BsC prize award) and PhD in materials science and nanotechnology (2023, PhD prize awarded) both at the University of Malaga (Spain). My doctoral research (funded by FPU grant) focused on the microstructural tailoring of nanocomposite electrodes to improve the efficiency and durability of Solid Oxide Fuel Cells (SOFCs). During my PhD, I completed two research stays at the Technical University of Denmark (DTU), for a total of 7 months, where I prepared Vertically Aligned Nanocomposites (VANs) by pulsed laser deposition for energy conversion devices. From 2023 to 2025, I worked as a Postdoctoral Researcher at DTU Energy in the Solid-State Electrochemistry Section (24 months) developing "Metal-Supported Cells" for efficient long-term steam electrolysis. My work at DTU has resulted in several publications in prestigious journals such as Nature Communications and Nano Energy, both as first and corresponding author. In June 2025, I returned to the University of Malaga as Postdoctoral Researcher with a competitive "attract talent" grant from Junta de Andalucía co-founded by EU. I was also granted with a "Juan de la Cierva" scholarship at IREC, Barcelona, at the same time (declined).

Regarding my academic record, I have co-authored 36 peer-reviewed publications (17 as first author, 9 as second author and 9 as corresponding) with high IF in the fields of materials science and energy conversion, most of them Q1. My work has attracted 602 citations and an h-index of 15 (Scopus), showing a consolidated growth and high relevance in my research lines. I have been an active contributor to the scientific community, with more than 40 contributions to national and international conferences, 19 as presenting author, including 10 oral presentations. I also serve as a regular reviewer for several scientific editorials (Elsevier, Wiley and SpringerNature), with a total of 44 articles revised. I have also been training students through teaching and supervision at different stages, including co-supervision of 2 BsC, mentoring 3 PhD students, as daily supervisor, and I have completed 336 hours of university teaching at the University of Málaga (5 years) (currently co-supervising 1 MSc student). I have received positive ANECA evaluations for the position of Profesor Contratado Doctor.



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DE CIENCIA, INNOVACIÓN
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

During my career, I have been self-funded by 10 individual research grants obtained through competitive calls (>320000 €), which reflects the ability to secure financial support. I have participated in 11 research projects related to materials for energy applications and nanoelectronics (5 funded by the Spanish national ministry and 3 by the Regional Government of Andalusia). In addition, I have been involved in 3 European funded projects, contributing as part of international consortiums to develop SOC devices and thin-film devices for nanoelectronics. I am an active user of international large facilities, participating in 4 beamtimes (1 as PI) employing nano diffraction, scattering and absorption instruments at synchrotron light sources (MAX IV) and neutron spallation (ISIS Neutron and Muon Source) for structural studies of thin films and oxide-ion conductors. I have actively participated in scientific outreach activities, including workshops, hands-on demonstrations for the general public and research-initiation programs for secondary school students.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: ELMOUWAHIDI , ABDELHAKIM
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Correo Electrónico: aelmouwahidi@ugr.es
Título: Expert in Carbon Materials for energy and environnement applications

Resumen de la Memoria:

Mi carrera investigadora se ha centrado en el desarrollo de materiales basados en carbono para aplicaciones en energía y medio ambiente, abarcando áreas como almacenamiento de energía, tratamiento de agua, electrocatalisis, Electro-Fenton y fotocatalisis. Inicié mi actividad científica en 2011 en la Universidad de Granada, en el Grupo de Materiales Carbonosos, donde realicé mi tesis doctoral, reforzada por una estancia predoctoral en el Instituto Jean Lamour (Universidad de Nancy, Francia) en 2015.

Antes de defender mi tesis, trabajé en el Ministerio de Industria y Nuevas Tecnologías de Marruecos, liderando proyectos estratégicos, implantando el sistema de gestión de calidad ISO 9001 y promoviendo la innovación industrial. Posteriormente, desarrollé mi investigación posdoctoral en la Universidad Sultan Moulay Slimane (Marruecos) durante 44 meses, centrada en la síntesis de materiales carbonosos derivados de residuos agrícolas para aplicaciones sostenibles.

Desde 2022, me incorporé nuevamente a la Universidad de Granada mediante el programa María Zambrano y, desde enero de 2025, continúo con un contrato posdoctoral vinculado a proyecto. Mi experiencia internacional suma 56 meses en Marruecos, Francia y España, consolidando una sólida red de colaboración con grupos de investigación en Europa, Latinoamérica, África y Asia. He participado en proyectos de cooperación internacional (Erasmus Mundus Al Idrissi, AECID) y supervisado 13 investigadores visitantes, además de dirigir 4 tesis doctorales, 2 en cotutela internacional, 1 de máster y 1 de grado.

Mi trayectoria investigadora se centra en la química inorgánica, los materiales de carbono avanzados, la catálisis y los procesos sostenibles orientados a la energía y la economía circular. He desarrollado una producción científica sólida y de impacto internacional: 31 publicaciones, 4 artículos en revisión, 1690 citas y h-index 18, con un porcentaje elevado de artículos en revistas Q1 como Advanced Functional Materials, Chemical Engineering Journal, Journal of Materials Chemistry A, Carbon o Bioresource Technology. He presentado más de 44 comunicaciones en congresos especializados y participado en 6 proyectos competitivos financiados por instituciones locales, nacionales y europeas.

He presentado resultados en congresos internacionales (ECS, ISE, CESEP, EuropaCat, International Carbon Conference) y soy editor invitado en la revista Materials. Además, cuento con 3 años de experiencia docente (135 h) y pertenezco a cuatro sociedades científicas (ARSED, AMSA, GEC, SEA).

Mi liderazgo se refleja en la obtención de premios a la excelencia investigadora (Universidad de Granada, 2020) y el Premio Extraordinario de Doctorado (UGR, 2017). He formado parte de comités organizadores y científicos en congresos internacionales y he impulsado actividades de divulgación científica, como la Noche Europea de los Investigadores y el Big Science Business Forum 2022.

En conjunto, mi trayectoria evidencia independencia, liderazgo y capacidad para generar conocimiento transferible, con impacto en energía, medio ambiente y desarrollo tecnológico, contribuyendo a la formación de investigadores y a la cooperación internacional para resolver problemas de relevancia social.

Resumen del Currículum Vitae:

Soy investigador especializado en el diseño y aplicación de materiales basados en carbono para procesos sostenibles en los campos de energía y medio ambiente, con líneas de trabajo en almacenamiento de energía, tratamiento de agua, electrocatalisis, Electro-Fenton y fotocatalisis. Mi trayectoria científica comenzó en 2011 en la Universidad de Granada, en el Grupo de Materiales Carbonosos, donde desarrollé mi tesis doctoral, reforzada por una estancia predoctoral en el Instituto Jean Lamour (Universidad de Nancy, Francia) en 2015.

Antes de defender mi tesis, trabajé en el Ministerio de Industria y Nuevas Tecnologías de Marruecos, liderando proyectos estratégicos, implantando el sistema de gestión de calidad ISO 9001 y promoviendo la innovación industrial. Posteriormente, realicé una estancia posdoctoral de 44 meses en la Universidad Sultan Moulay Slimane (Marruecos), centrada en la síntesis de materiales carbonosos derivados de residuos agrícolas para aplicaciones en energía, adsorción y fotocatalisis. Desde 2022, me incorporé nuevamente a la Universidad de Granada mediante el programa María Zambrano (24 meses) y, desde enero de 2025, continúo con un contrato posdoctoral vinculado a proyecto.

Mi experiencia internacional en Marruecos, Francia y España, consolidando una amplia red de colaboración con grupos de investigación en Europa, Latinoamérica, África y Asia. He participado en proyectos de cooperación internacional (Erasmus Mundus Al Idrissi, AECID) y supervisado 13 investigadores visitantes de instituciones de Colombia, Argelia, Túnez, México y Argentina. Además, he dirigido 4 tesis doctorales (una defendida en 2024 en la UGR), 2 en cotutela internacional, 1 tesis de máster y 1 trabajo fin de grado.

Mi producción científica incluye publicaciones en revistas de alto impacto como Carbon, Applied Catalysis B: Environmental y Advanced Functional Materials, (31 artículos, H index 18). He presentado resultados en congresos internacionales (ECS, ISE, CESEP, EuropaCat, International Carbon Conference) y soy editor invitado en la revista Materials. Además, cuento con 3 años de experiencia docente (135 horas) y pertenezco a cuatro sociedades científicas (ARSED, AMSA, GEC, SEA).

Mi liderazgo se refleja en la obtención de premios a la excelencia investigadora (Universidad de Granada, 2020) y el Premio Extraordinario de Doctorado (UGR, 2017). He formado parte de comités organizadores y científicos en congresos internacionales y he impulsado actividades de divulgación científica, como la Noche Europea de los Investigadores y el Big Science Business Forum 2022.

En conjunto, mi perfil combina investigación de excelencia, liderazgo, internacionalización y transferencia de conocimiento, contribuyendo al avance científico y tecnológico en los ámbitos de energía y medio ambiente, con impacto en sostenibilidad y desarrollo industrial.



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DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: OSORIO TEJADA, JOSE LUIS
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Correo Electrónico: joseosoriotejada@gmail.com
Título: Sustainable Energy Systems: Assessment and Optimization of Emerging Decarbonisation Technologies
Resumen de la Memoria:

The applicant's scientific trajectory is defined by the development of integrated sustainability assessment methodologies for emerging energy and chemical technologies, combining LCA, Social LCA, techno-economic analysis (TEA), process modelling and circularity metrics. His doctoral work pioneered the introduction of socio-economic indicators into transport systems through Social LCA, establishing a novel line of research that has since attracted international interest and positioned him among the very few experts worldwide capable of applying S-LCA to industrial and technological systems. After the PhD, he expanded this line to new sectors, such as chemical processes, renewable fuels, plasma technologies, and distributed production, contributing to methodological advances and high-impact publications.

During postdoctoral appointments in Colombia and the UK, he strengthened his expertise in techno-economic modelling and scale-up of low-TRL technologies, developing analytical frameworks for decentralised ammonia production, plasma-driven CO₂ conversion, and electrified reactors. His trajectory reflects growing independence: leadership of sustainability work packages in European consortia, methodological development for national projects in Spain and Colombia, and the consolidation of a cross-cutting research portfolio capable of linking engineering, environmental assessment and socio-economic analysis.

The research line proposed for the RyC grant aims to accelerate the development and deployment of technologies supporting the energy transition. It is structured around three axes: (1) industrial decarbonisation through electrified and CO₂-based technologies, evaluating and optimising CCUS, Power-to-X pathways, electrified thermal and chemical processes, and intensified reactors (plasma, electrosynthesis), while identifying scale-up barriers, operating windows, and levelised costs; (2) transport decarbonisation and its integration with distributed industrial systems, quantifying energy penalties, operating costs, payload constraints, and CO₂ crediting mechanisms in heavy-duty transport, and integrating logistics with decentralised industrial configurations; and (3) advanced sustainability assessment, expanding integrated methodologies that combine LCA, Social-LCA, and impact monetisation to inform early-stage design of low-TRL technologies.

This research line represents a natural evolution from the applicant's previous work: it shifts from assessment of isolated technologies (S-LCA, hybrid LCA, TEA) toward a more integrated and design-oriented approach focused on optimisation, technological bottlenecks, and scale-up strategies for electrified reactors, CCUS processes, and Power-to-X systems. It also broadens the scope from transport-centred sustainability analysis to a system-wide perspective linking industrial decarbonisation, logistics, and distributed production. This establishes a coherent, independent research agenda aligned with major national and European priorities in energy, industry, and climate neutrality.

Resumen del Currículum Vitae:

The applicant has established a solid international career with 26 peer-reviewed publications (most in Q1 journals, 15 as first author), including a front-cover article in Energy & Environmental Science and a Green Chemistry paper selected by the Royal Society of Chemistry as one of the most impactful sustainable chemistry contributions of the year. His work has received 1,260 citations (h-index 16), with 441 citations in the last year. All papers are openly accessible through journals or repositories.

He has presented his research at 13 international conferences, including an invited lecture at the 3rd SoAE Symposium (Shanghai, 2024) and a keynote presentation at the VII Research Symposium Applied to Process Engineering (Colombia, 2022). His methodological contributions include the GATWATER software for organisational water-footprint assessment (registered and transferred to the Technological University of Pereira) and analytical tools for evaluating industrial decarbonisation pathways.

The applicant has demonstrated strong leadership in large-scale international projects. As PI of the UKRI-Horizon Europe OPeraTIC project at the University of Warwick, he leads sustainability assessment activities involving 14 industrial and academic partners. In the ERC Synergy Grant SCOPE, he is responsible for the sustainability modelling of plasma-assisted chemical processes. He also contributes to national projects in Spain (CAPTICES, COL-ACREFIN) and previously led environmental assessment initiatives in Colombia on carbon and water footprint protocols.

His work has societal impact: four years of industrial experience informed research on freight transport sustainability across three continents, involving fieldwork with companies, associations, and public administrations. Findings were disseminated through professional media and sectoral organisations. He founded a consultancy@startup delivering LCAs and environmental footprinting in Colombia, and has participated as an invited expert in national media discussions on renewable energy and sustainability policy.

He has supervised three MSc theses and mentored one PhD thesis, and evaluated MSc and PhD theses in Colombia, Spain, and the UK. His academic service includes peer reviewing for leading journals (including Nature Energy), membership on scientific committees (ICSEE 2026, UCRA 2022), and participation in Social LCA case studies with NGOs, communities, and industry stakeholders. He is a member of LCA-RSIN, contributing to discussions on LCA accreditation and UK policy, and actively participates in Warwick's Sustainability Spotlight programme.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

He maintains a strong international collaboration network with researchers in Belgium, Australia, France, Italy, Germany, Turkey, Vietnam, Malaysia, the UK, Spain and Colombia, enabling joint publications and interdisciplinary advancements.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: GERBER MACHADO, PEDRO
Referencia: RYC2025-055486-I
Correo Electrónico: ppgerber@gmail.com
Título: Integrated Sustainability Modelling for Renewable Energy Systems and Socioeconomic Transitions
Resumen de la Memoria:

My research trajectory integrates techno-economic analysis, life-cycle sustainability assessment, spatial modelling and macroeconomic simulation to understand how renewable energy systems interact with society, land availability and regional economies. I began my career in Brazil analysing the environmental and socioeconomic dimensions of bioenergy expansion, developing indicator frameworks and georeferenced tools to assess local impacts from sugarcane, ethanol and bioproduct supply chains. This early work, carried out under the BIOEN Program and at the Brazilian national Bioethanol Laboratory, combined field data, process modelling and socioeconomic statistics, establishing the foundations for my subsequent multi-scale approach.

During my PhD and international research stays in the Netherlands (University of Groningen), I expanded this work toward system-wide modelling, linking process-based life cycle assessment and energy balances with computable general equilibrium (CGE) models to quantify macroeconomic, land-use and emissions impacts of emerging technologies and the bioeconomy. I then consolidated this experience at my posdoc at the University of São Paulo, where I contributed to the São Paulo State Energy Model in collaboration with public agencies, integrating energy demand, industrial activity, emissions trajectories and regional development indicators. Later on, I went to work at Imperial College London, where I expanded my research to CCS deployment using expert elicitation, transport-related air pollutant mitigation and liquified natural gas alternatives for freight, consistently connecting technical analysis with societal outcomes.

Since joining IMDEA Energía, my trajectory has shifted toward developing integrated modelling frameworks for sustainable aviation fuels, hydrogen pathways, carbon capture and utilization, and spatial optimisation. I increasingly work at the interface between detailed process information and national-scale energy planning, contributing methodological leadership to the Madrid Vuela Sostenible hub and Horizon Europe projects focused on circularity, solar fuels and environmental thresholds. Across these experiences, a central theme has been the creation of transparent, reproducible modelling workflows and the harmonisation of techno-economic and sustainability data to support robust scenario building.

My proposed Ramón y Cajal research line, ENERSYN-Spain, builds directly on this trajectory. The goal is to identify renewable energy pathways that maximise socioeconomic and environmental returns for Spain while respecting real-world constraints, including biomass availability, suitable land, investment capacity, critical materials, and the need to train specialised workers. ENERSYN-Spain will integrate a high-resolution national resource atlas with a Spain-calibrated CGE model via an automated, open pipeline to generate consistent techno-economic parameters. This structure will enable rigorous “what-if” assessments, transparent uncertainty analysis, and clear identification of which energy portfolios deliver the highest national benefits. By openly releasing all data and tools, the project aims to provide a reproducible evidence base to support regional planning, industrial strategy, and long-term energy policy in Spain.

Resumen del Currículum Vitae:

I am an energy-systems researcher specialising in integrated sustainability modelling, with more than 40 peer-reviewed publications (h-index 19, i10-index 30) covering techno-economic analysis, life-cycle assessment, environmental modelling, transport systems, macroeconomic evaluation and evidence synthesis. My work appears in leading journals such as Journal of Cleaner Production, Renewable and Sustainable Energy Reviews, Science of the Total Environment, Atmospheric Environment and Biofuels, Bioproducts & Biorefining. This output reflects a long-standing line of research that links detailed process information to regional and national energy-system planning, connecting environmental, economic, and social dimensions. Several publications have established methodological advances, including the integration of life cycle assessment with general equilibrium models, expert elicitation for the deployment of new technologies, and multi-impact assessments for transport planning. My review of sustainable aviation fuels has become a highly cited reference in the field.

I have participated in more than 15 R&D projects funded by national and international agencies and industry, including Shell, Petronas, Repsol, FAPESP, CNPq, the European Commission, and the Community of Madrid. My experience spans linking process analysis, techno-economic modelling for industrial partners, and regional planning projects developed for public institutions. I was awarded the Shell/CNPq/Imperial College Fellowship (2019–2021), during which I worked 2 years at Imperial College London on modelling and econometric modules for long-term sector-specific energy projections. At the University of São Paulo, I contributed to the São Paulo State Energy Model, working with the State Secretariat for Energy and Mining on scenarios for economic development and emissions reduction.

My international background includes research or training periods at EPFL (Switzerland), the University of Groningen (Netherlands), Imperial College London (UK), and USP and UNICAMP (Brazil's first- and second-largest and best universities). At IMDEA Energía, I currently provide methodological leadership to the Madrid Vuela Sostenible hub and collaborate on Horizon Europe projects addressing circularity, solar fuels, and spatial constraints. This work has strengthened my expertise in multi-scale modelling, open data pipelines and cross-sector data harmonisation.

My academic activities include supervising MSc and PhD students whose work has resulted in publications in Q1 journals, teaching courses in statistics, energy sustainability and scenario modelling, and participating in mentoring programmes. I regularly review for journals such as Applied Energy, Journal of Cleaner Production, Renewable Energy and Resources, Conservation & Recycling, and I have been invited as a keynote speaker at international conferences such as SDEWES 2025. My CV reflects a consolidated profile combining scientific independence, interdisciplinary collaboration and sustained contributions to open, reproducible modelling tools that support evidence-based energy and environmental policy.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: LLUSCÀ JANÉ, MARTA
Referencia: RYC2025-055244-I
Correo Electrónico: marta.llusca@gmail.com
Título: Diseño, fabricación y caracterización de películas delgadas para aplicaciones en energía y transporte
Resumen de la Memoria:

I am an expert in thin film simulation, fabrication, and characterization, with a focus on solar cells, low-emissivity coatings, first-surface mirrors, optical filters, and weather-resistant coatings. My research journey began during my undergraduate studies in physics, where I participated in national and international research programs. I worked at Helmholtz-Zentrum Berlin, Germany, investigating Na incorporation in CIGS solar cells and at the Institute of Materials Science of Barcelona, optimizing ITO thin films. During my Master and PhD, I focused on optimizing transparent conducting contacts for thin-film silicon solar cells, using light trapping and spectral conversion techniques to enhance solar cell efficiency. I gained expertise in high-vacuum deposition systems and various thin film characterization techniques, including electrical, optical, chemical, structural, and morphological analyses. My PhD, funded through national and international projects, involved collaborations with institutions like CIEMAT, Centro Laser, and Forschungszentrum Jülich. My PhD work resulted in six peer-reviewed publications. I completed it in 2015 with Cum Laude qualification. In 2016, I joined the Future Industries Institute at UniSA, shifting my focus to industry-driven projects. My first project was the Heliostat SA (2016-2017), which aimed to develop a lightweight, antistatic first-surface mirror for heliostats in concentrating solar power plants. This project allowed me to develop leadership and project management skills. I took on the project leadership in December 2016, and by mid-2017, the team successfully developed a reflective, durable, and cost-effective mirror, earning the UniSA Research Excellence Award for Industry Impact and meeting all project goals. The technology has since been transferred to Impacts Renewable Energy, and together we have secured a \$0.5 M grant to advance the TRL from 4 to 5. This funding will support the construction of a CST demonstrator to showcase the technology to potential investors. In 2017, I became Principal Investigator of the Light-weight Plastic Glazing project (2017-2023), a collaboration with the Malaysia Automotive, Robotics & IoT Institute. The project aimed to develop durable infrared reflective coatings for lightweight windows used in electric buses. The project resulted in two filed patents and 8 journal articles. This project further developed my skills in patent processes, industry collaboration, and the commercialization of technologies. I also gained strong expertise in design, fabrication and characterization of optical coatings, as well as on industry-standard testing (corrosion, abrasion, accelerated weathering). In 2023, I was promoted to Senior Research Fellow and joined the entX Limited project. I contributed to the development of a betavoltaic battery, exceeding the performance of commercially available options (provisional patent filed). I also gained certification to handle unsealed radioactive substances and developed my expertise in radioactive materials and advanced battery technologies. My research trajectory has been marked by strong project management, industry engagement, and a focus on translating research into practical solutions. I also mentor early-career researchers and I supervise PhD, Master's, and undergraduate students.

Resumen del Currículum Vitae:

I am a Senior Research Fellow at UniSA's Future Industries Institute. I am a physics graduate and I have a Master in Physical Engineering. I completed my PhD in thin film solar cells at the University of Barcelona in 2015 and I joined UniSA as a postdoctoral researcher in March 2016. Since then, I have been working on industry-focused projects, undertaking fundamental science, and translating research into commercial products through meeting milestones under tight schedules. The first project I was involved in at FII was the Heliostat SA (Jun 2016- Dec 2017) project funded by the industry partner, Precision Components. UniSA was tasked to develop a light-weight antistatic mirror for use on heliostats as part of Concentrating Solar Thermal (CST) plants. During the first months I worked as part of the research team, but in December 2016 I took on the leadership of the whole research project. In mid-2017, the Heliostat SA research team accomplished the objective to develop a highly reflective, durable and antistatic first surface mirror onto a large plastic substrate, successfully meeting all project goals. In recognition of these achievements, we received a UniSA Division of Information Technology, Engineering and Environment award in 2017 for Research Excellence: Industry or Applied Impact and Uptake. The results were published in Adv. Eng. Mater. and SOLMAT. We transferred the technology to Impacts Renewable Energy, and I subsequently secured a government-funded grant of approximately \$0.5M to build a small-scale CST demonstrator and showcase the technology to potential investors. Afterwards, I continued my leadership role in the Light-weight Plastic Glazing project (2017-2022), a collaboration with the Malaysia Automotive, Robotics & IoT Institute (MARII). With a \$5M budget and a focus on developing infrared reflective coatings for lightweight windows, the project led to 2 filed patents and 8 articles in SOLMAT, J. Build. Eng. or Appl. Surf. Sci. Adv. In 2023, I was promoted to Senior Research Fellow and began working on a new project in collaboration with entX Limited. This project focuses on the development of a betavoltaic battery and has resulted in a provisional patent and 2 articles. My role involves leading the thin film research at UniSA and mentoring early-career researchers. In addition to my ongoing research, I obtained certification to handle unsealed radioactive substances in laboratories. Parallel to my research work, I actively seek out industry partnerships and funding opportunities. I secured \$12K funding to employ a researcher during maternity leave and won a \$22.6K grant for a project to develop mirrors for space satellites. This led to a further \$149.5K grant with Defence Science and Technology. I constantly work on translating my research into commercial outputs, as demonstrated by my participation in the Cruxes Accelerator program (2021) and the UniSA LaunchPad Program (2020) where I contacted more than 50 companies, or the joint application with Impacts to the AEA Ignite grant (500,000 AUD) to develop a CST test field. I have supervised 7 PhD, 5 Master and 7 undergraduate students. I also contribute to community outreach activities, such as giving science talks to primary school students during the National Science Week.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: CASADO PEREZ, NEREA
Referencia: RYC2025-056875-I
Correo Electrónico: nerea.casado@ehu.eus
Título: Mixed ionic-electronic conductors for energy storage and conversion

Resumen de la Memoria:

I have a multidisciplinary academic background with research experience in redox polymers, conducting polymers, ionic polymers, electrochemistry and applications of polymers in batteries and bioelectronics devices. During my career I have been able to achieve several scientific achievements. To date, I have published 66 peer-reviewed articles (12 as (co)corresponding author). In addition, I am (co)author of 3 patents, 3 book chapters and I have co-edited one RSC book in the Polymer Chemistry Series. My current h-index is 27 in Scopus and Google Scholar. In total, my publications have 2250 citations (>500 in 2024) in Google Scholar. In 2024, I was awarded the ISE Prize in Electrochemical Materials Science for my work in electroactive polymers for batteries.

My PhD research was focused on the development of redox polymers with conducting properties to be applied as electrode materials in batteries, where I synthesized a new polymer with synergetic redox and conducting properties named PEDOT-TEMPO (ACS Macro Lett. 2016). Another interesting polymer was the one developed by the combination of the conducting polymer PEDOT with the biopolymer lignin, which was synthesised by electrochemical and chemical polymerization to develop sustainable electrodes (J. Mater. Chem. A. 2016, highly cited with >230 citations). During my first post-doctoral period, I developed a dual redox-active polymer that was applied as cathode and anode material in a symmetric battery. This was the first example of a symmetric polymer battery without previous modification of the polymer to be used as anode (ChemSusChem, 2020, Selected as Very Important Paper).

During my post-doctoral research (2018-2022), I developed a new research line related to mixed ionic-electronic conductors (MIECs) for energy storage and bioelectronics applications at POLYMAT and in close collaboration with Deakin University, where I started to publish as (co)corresponding author. I have demonstrated that we can tune the electronic and ionic conductivities in the composite materials playing with the chemistry and composition of conducting polymers and organic ionic plastic crystals (ACS Appl. Polym. Mat, 2021). We have evidenced their potential as conductive binders by replacing totally carbon and binder additives in solid-state Li-ion battery cathodes for the first time (J. Mater. Chem. A. 2022). On the other hand, my team has also developed MIECs as electrocardiogram recording electrodes by combining biocompatible ionic liquids and conducting polymers (J. Mater. Chem. C, 2022).

Since 2022, with the Ikerbasque Research Fellowship, I have developed fluorine-free functional polymer binders for battery electrodes varying the chemistry to achieve target properties like ionic conductivity, mixed ionic-electronic conductivity, water processability or self-healing behaviour (Adv. Energy Sustainability Res. 2023; RSC Appl. Interfaces, 2025). Lastly, I have just entered the field of hydrogen technologies by the development of protic polymers (Polym. Chem., 2024) and composite membranes (ACS Appl. Poly Mat. 2025) for fuel-cells. The knowledge gained during my career so far will be applied to design and engineer mixed ion-electron conductive polymers to advance the development of a range of electrochemical devices for energy storage and conversion, with special focus on fuel-cells and electrolyzers.

Resumen del Currículum Vitae:

I have a multidisciplinary academic background with research experience in redox polymers, mixed ionic-electronic conductors, electrochemistry and applications of polymers in energy storage systems. I was awarded the Best Academic Record Award in Chemistry in 2012 at UPV/EHU. In 2024, I was awarded the ISE Prize in Electrochemical Materials Science for my work in electroactive polymers for batteries.

I have published 66 peer-reviewed scientific articles, 12 as (co)corresponding author, in top journals in Energy & Materials Science such as Adv. Energy Mat. (1 paper), Adv. Mat. (1), J. Energy Storage (2) or J. Mat. Chem. A (4). I am (co)author of 3 patents, 3 book chapters and I co-edited one RSC book in the Polymer Chemistry Series. My current h-index is 28 with overall of 2376 citations (>500 in 2024). I have participated in >20 international conferences, including 6 invited and 1 plenary lectures.

During my career, I have gained grants for carrying out my research activities such as a PhD fellowship from Basque Government (4 years) and a post-doctoral fellowship from UPV/EHU (2 years). I have participated in National (5) and European (8) funded projects, and contracts with private entities: Oribay Group Automotive, Bolloré Blue Solutions, Toyota Europe and TESA (in 3 of them as co-IP). I am IP of a European project (SALAMANDER) and Basque Government PIBA (2025_1_0031). It is worth mentioning that in ERC starting grant 2024 call, I arrived till the step 2 interview stage.

I have demonstrated group leadership skills as I have codirected 3 defended PhD thesis (Rafael del Olmo, "Organic Mixed Ionic Electronic conducting materials for batteries" 2022; Soline Vauthier "Innovative polymers for lithium ion batteries" 2023 and Naroa Lopez "Multifunctional and 3D printable PEDOT-based materials for Bioelectronics" 2024) and 2 other PhD thesis in collaboration with CICenergiGUNE finishing in 2025: Laura Pastor "Nitroxyl Radicals-based Efficient Electrolytes for Aqueous Organic Redox Flow Batteries", Jorge Lopez "Ionic Materials for Thermal Energy Storage". I am currently codirecting other 6 PhD thesis in the topics related to materials for Energy: i) Paula Garcia "Mixed Ionic Electronic conducting polymers for energy applications", ii) Hegoi Urretabizkaia "Anion Exchange Polymer membranes for hydrogen production", iii) Arpita George "Developing Anhydrous Proton Conducting Membranes for Intermediate Temperature PEM Fuel Cells" at Deakin University, iv) Frederic Malter "High peel strength polymers for adhesive and electrode binder applications" (part of an industrial contract with TESA), v) Karol Jagodziński "Functional polymer binders for Silicon anodes", vi) Alister Urain "Thermo-Electrochromic Materials for Automotive Applications". Moreover, I have supervised 2 postdoc researchers (Dr. Lingua, working on self-healing binders, Dr. Abdel-Aziz on electrochemical characterization and devices).



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Turno General

I have established an important national and international collaboration network, with researchers from Deakin Univ. (AUS), Cambridge Univ. (UK), Uppsala & Linköping Univ. (SW), IMDEA Energy, TECNALIA and CIC EnergiGUNE (SP). As a result, 35 of the 66 scientific articles published include international collaborations and 3 patents with Toyota Motor Europe.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Energía y transporte
Nombre: SERAFIN , JAROSLAW
Referencia: RYC2025-056569-I
Correo Electrónico: jaroslawserafin23@tlen.pl
Título: Doctor en ingeniería química e ingeniería de materiales

Resumen de la Memoria:

Mi trayectoria científica se ha desarrollado en la intersección de los materiales avanzados, la energía sostenible y la química de interfaces, con una evolución clara hacia una línea independiente centrada en MXenes, materiales híbridos $\text{TiO}_2/\text{MXene}$ y carbones de biomasa para la producción fotocatalítica y electroquímica de hidrógeno, así como para la captura y reducción de CO_2 . Tras completar un doble doctorado cum laude en Ingeniería de Materiales (2019) e Ingeniería Química (2022), adquirí una sólida formación en síntesis de materiales porosos, catálisis, fotocatalisis, caracterización avanzada y diseño instrumental.

Mi contribución inicial consistió en el desarrollo innovador de carbones activados derivados de biomasa, con metodologías originales de activación y análisis que hoy se aplican en captura de CO_2 , almacenamiento de H_2 y procesos de separación. Estas aportaciones dieron lugar a colaboraciones internacionales estratégicas y patentes, posicionándome tempranamente como referente en materiales carbonosos funcionales.

La transición hacia la fotocatalisis y la producción de hidrógeno se consolidó durante mi estancia en la Universitat Politècnica de Catalunya, donde desempeñé un papel protagonista en la síntesis de catalizadores M/TiO_2 ; y en el diseño experimental de procesos foto(electro)catalíticos. Durante el postdoctorado construí de manera autónoma un fotoreactor de flujo continuo, desarrollado íntegramente por mí, que constituye un hito clave en mi independencia metodológica y en mi capacidad para generar instrumentación propia para la investigación.

Con más de 90 artículos (60 como primer autor o de correspondencia), 23 patentes y más de 3150 citas ($h = 29$), mi producción científica se sitúa en rangos internacionales de excelencia, siendo reconocido en 2024 y 2025 entre el 2% de los científicos más influyentes del mundo. Mantengo colaboraciones activas con 16 centros de 13 países, incluidas figuras de referencia mundial como Teresa Bandosz (CUNY, EE.UU.), Katsumi Kaneko (Japón) y Vanessa Fierro (Francia), lo que evidencia mi liderazgo consolidado en MXenes y materiales bidimensionales.

Mi línea de investigación actual se centra en el diseño racional de nanomateriales híbridos $\text{TiO}_2/\text{MXenes}$, biomasa para la producción solar de hidrógeno, la reducción fotocatalítica de CO_2 ; y el almacenamiento energético. La integración de MXenes con TiO_2 ; y carbono ofrece propiedades sinérgicas únicas alta conductividad, amplificada absorción visible, separación eficiente de cargas y sitios catalíticos activos que abren nuevas perspectivas para procesos energéticos sostenibles. Este enfoque se complementa con el uso de biomasa como recurso circular para obtener carbones activados avanzados con aplicaciones simultáneas en fotocatalisis y supercondensadores.

La propuesta se alinea de manera directa con las prioridades estratégicas europeas (Green Deal, Fit for 55, Net Zero 2050) y con la Ruta del Hidrógeno 2050 de España. Mi objetivo como investigador Ramón y Cajal es consolidar un núcleo sólido de investigación competitiva en España, capaz de atraer talento, generar innovación instrumental y liderar el desarrollo de materiales bidimensionales y tecnologías solares para una transición energética limpia y sostenible.

Resumen del Currículum Vitae:

Soy doctor en Ingeniería de Materiales (2019, cum laude) y en Ingeniería Química (2022, cum laude), con una trayectoria centrada en el desarrollo de materiales avanzados para aplicaciones energéticas y medioambientales: MXenes, $\text{TiO}_2/\text{MXene}$; materiales carbonosos, fotocatalisis, electrocatalisis, captura y conversión de CO_2 ; y almacenamiento de hidrógeno. Mi actividad investigadora se ha desarrollado en universidades y centros de 13 países, con una sólida proyección internacional y una línea científica actualmente consolidada en la Universidad de Barcelona.

He publicado más de 90 artículos, 60 de ellos como primer autor o autor de correspondencia, con más de 3150 citas y un índice h de 29. Soy autor de 23 patentes, 4 monografías y múltiples contribuciones a congresos. En 2024 y 2025 fui incluido entre el 2% de los científicos más influyentes del mundo según el ranking de Stanford. Además, he impartido conferencias plenarias invitadas y he participado como editor y revisor en diversas revistas internacionales, revisando más de 250 manuscritos.

Mi experiencia en proyectos incluye la participación en 10 iniciativas financiadas por MCIN/AEI, Horizon Europe, AGAUR y agencias de investigación de Brasil, Kazajistán, Colombia y Noruega. Aunque en algunos casos no pude figurar oficialmente como IP debido a la naturaleza contractual, asumí responsabilidades clave en diseño experimental, síntesis de materiales, interpretación de resultados, coordinación técnica y redacción científica. También he sido IP en proyectos en Polonia y en el Recircula Challenge de la UPC.

He realizado estancias científicas y docencia en España, Polonia, Colombia, Brasil, Marruecos y Suecia, y mantengo colaboraciones activas con grupos de referencia internacional, incluyendo CUNY (EE.UU.), Chalmers University (Suecia) y la Universidad de Los Andes (Colombia). Estas colaboraciones han resultado en publicaciones conjuntas, actividades formativas y proyectos de investigación compartidos.

En el ámbito docente, he impartido asignaturas de Química General, Química Inorgánica e Ingeniería Química en la Universidad de Barcelona, y Reactores Químicos y Fundamentos de Química en la West Pomeranian University. He dirigido 4 tesis de máster, codirigido 4 tesis doctorales internacionales y he supervisado estudiantes Erasmus+. También he actuado como evaluador de propuestas en Chile y Colombia y como miembro de tribunales doctorales.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

Mi currículum evidencia una trayectoria coherente, productiva y de impacto, con una orientación clara hacia el desarrollo de materiales avanzados para la transición energética y la sostenibilidad, respaldada por una intensa cooperación internacional y una creciente independencia científica.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: RODRÍGUEZ GÓMEZ, GUILLERMO
Referencia: RYC2025-057186-I
Correo Electrónico: guilro06@ucm.es
Título: Quantitative Approaches to Pleistocene Archaeology and Human Paleoeecology

Resumen de la Memoria:

My research trajectory centers on understanding how ecological constraints shaped human settlement, subsistence and demography during the Pleistocene in Western Eurasia. I approached Pleistocene archaeology from a quantitative, ecology-driven perspective. During my PhD (URV-CENIEH, 2015) I developed a paleoecological framework that links faunal assemblages, trophic structure and human behavior, with a particular focus on meat availability, competition with carnivores and sustainable human population densities. This line of research has progressively evolved from site-based case studies to regional and continental syntheses. Early work at Atapuerca introduced a quantitative model to estimate potential meat yields and human-carnivore competition, allowing us to show that cannibalism at TD6 was not driven by long-term resource scarcity and that changing competition regimes likely constrained hominin presence around 600 ka. Subsequent applications to the Early Pleistocene sites of Orce demonstrated that ecological conditions were not limiting prior to human arrival, implying that the delayed occupation of southwestern Europe relative to Dmanisi cannot be explained by meat shortages alone. In a second phase, I extended this framework to assess the sustainability of human subsistence strategies and to reconstruct carrying capacity and predator-prey biomass ratios. Studies at Venta Micena and other Orce sites, Valdegoba Cave and the Upper Lozoya Valley quantified how much biomass hominins and carnivores could exploit without collapsing prey populations, providing new estimates of territory size, mobility patterns and demographic robustness for Neanderthals and earlier human groups. Parallel work on the Santa Cruz Formation in Argentina showed that these methods are transferable beyond the Eurasian Pleistocene, highlighting their broader paleobiological relevance. Methodologically, my research has culminated in a paleosynecological approach (PSEco) that combines community ecology, demographic modeling and network analysis. It is implemented through openly available code and, more recently, the StablePopulation R package, which formalizes demographic and paleodemographic tools for archaeological applications. During the Ramón y Cajal contract I will consolidate this independent research line by applying PSEco, paleoclimate reconstructions and demographic models to more than forty paleocommunities in Western Eurasia. The goal is to build a robust ecological and demographic framework for early human expansion, clarifying how resource structure, carnivore guild composition and population dynamics conditioned the persistence, disappearance or re-colonization of Pleistocene human groups.

Resumen del Currículum Vitae:

My curriculum reflects a consolidated academic and research trajectory in Pleistocene archaeology and human ecology, combining competitive positions, substantial funding, international mobility, teaching, supervision and outreach. My research career is rooted in Pleistocene archaeology and human prehistory, supported by a multidisciplinary background at the University of Seville and consolidated through a PhD in the Quaternary and Prehistory program at the University Rovira i Virgili, carried out at CENIEH with a national FPI predoctoral grant. Since completing my PhD, I have held successive competitive contracts: IdEx postdoctoral fellow at the University of Bordeaux (PACEA), Juan de la Cierva postdoctoral fellow at the University of Malaga (UMA), and two Talent Attraction contracts from the Community of Madrid at the Complutense University of Madrid (UCM), the latest within the César Nombela Research Talent Attraction program. These positions, together with predoctoral and short-stay grants, amount to more than €780,000 in competitive funding. As Principal Investigator, I have led three projects: an IdEx Bordeaux project on the Kozarnika archaeo-paleontological site (Bulgaria), a Community of Madrid project on Neanderthal paleodemography and paleoecology in the Upper Lozoya Valley, and a project on the first human settlement of the Near East, Caucasus and Europe from the perspective of faunal resources. My scientific output includes 58 publications, of which 34 are SCI articles, 88% in Q1-Q2 journals. I occupy leading authorship positions (first, second or last author) in 71% of these papers, and 62% are independent of my PhD supervisors, evidencing scientific autonomy and leadership. I have participated in 18 competitive research projects (10 national, 3 international, 3 regional and 2 university projects) and contributed 79 conference presentations, 38 of them at international meetings. My international experience includes research stays and contracts in the United Kingdom (Natural History Museum, London), Germany (ROCEEH-Senckenberg, Frankfurt), France (PACEA, University of Bordeaux) and Argentina (MACN and National University of La Plata), as well as collaborations in ERC projects on Pleistocene population dynamics in the Southern Caucasus and on subsistence resilience in prehistoric Europe. I have accumulated more than 600 hours of university teaching at the UBU, UMA and UCM, supervised four Master's theses and currently co-supervise two PhD dissertations (University of Castilla-La Mancha (UCLM), UBU). I regularly participate in excavation campaigns at key sites (Atapuerca, Orce, Pinilla del Valle, Baza-1, Canal de San Clemente) and in outreach activities, including popular science articles, guided visits and media appearances in national radio, press and podcasts. I am committed to open science, co-authoring the StablePopulation R package (CRAN) and making databases and code publicly available. My trajectory is formally recognized by the R3 certification as an established researcher from the Spanish State Research Agency and by ANECA accreditations for Assistant Professor, Contracted Professor and Associate Professor (Profesor Titular de Universidad).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología

Nombre: MARTINS FONTE, JOAO MARIO

Referencia: RYC2025-054386-I

Correo Electrónico: joaofonte@gmail.com

Título: Joao Fonte

Resumen de la Memoria:

Mi trayectoria científica se define por una aproximación interdisciplinar que integra la Arqueología del Paisaje con las tecnologías geoespaciales. Mi investigación se ha consolidado en la intersección entre el estudio de los procesos históricos de expansión del estado romano y el desarrollo de metodologías digitales avanzadas para la detección y análisis del registro arqueológico.

Mi investigación inicial se centró en la transición de la Edad del Hierro a la época romana en el Noroeste Peninsular. A través de mi tesis doctoral y etapas postdoctorales, he analizado cómo la expansión militar romana transformó los paisajes indígenas, utilizando tecnologías geoespaciales para documentar estos cambios a gran escala. Esta línea de trabajo evolucionó rápidamente hacia una perspectiva comparativa a nivel europeo. Gracias a la financiación postdoctoral de la Xunta de Galicia y la prestigiosa beca Marie Skłodowska-Curie en la Universidad de Exeter, he expandido mi análisis a otros territorios fronterizos del Imperio, como el suroeste de Inglaterra y Dacia (Rumanía). Este enfoque me ha permitido identificar patrones de asentamiento y estrategias de control territorial en paisajes marginales, contribuyendo significativamente al debate sobre el imperialismo romano y la interacción cultural en las fronteras imperiales.

Un pilar fundamental de mi trayectoria ha sido la innovación en el uso de sensores remotos. He sido pionero en la aplicación sistemática de LiDAR y su combinación con imagen aérea y satelital para la detección de sitios arqueológicos. Mi trabajo ha demostrado cómo estas herramientas no invasivas pueden reescribir la historia de la presencia militar romana, revelando una densidad de ocupación previamente desconocida en el Noroeste Peninsular. Actualmente, mi investigación lidera una transición crucial en la disciplina: el paso de la interpretación visual a la automatización mediante Inteligencia Artificial. Como Investigador Principal y colaborador en diversos proyectos, estoy desarrollando y validando algoritmos de aprendizaje profundo para la detección automática de formas arqueológicas en grandes volúmenes de datos geoespaciales. Mis publicaciones más recientes abordan el desafío de crear arquitecturas de redes neuronales eficientes para la arqueología, posicionando mi trabajo en la vanguardia de la Arqueología Computacional. Complementando su perfil técnico, mantengo un fuerte compromiso con la divulgación y la ciencia ciudadana. Como miembro del colectivo romanarmy.eu, he trabajado en la socialización del conocimiento sobre la presencia militar romana, utilizando medios digitales para conectar la investigación académica con el público general. Mi enfoque actual busca democratizar el acceso a los datos arqueológicos y fomentar la validación de campo colaborativa, cerrando la brecha entre la detección remota y la verificación arqueológica tradicional.

Mi perfil integra la experiencia en arqueología comercial y académica, resultando en un estilo de liderazgo versátil y robusto. Destaco por mi capacidad de gestión estratégica y técnica de equipos en el sector empresarial, así como por la administración rigurosa de financiación competitiva. Mi trayectoria avala una sólida competencia para la colaboración en redes científicas multidisciplinares y la dirección operativa tanto en trabajos de campo como en la supervisión científica.

Resumen del Currículum Vitae:

Mi trayectoria profesional se encuentra sólidamente consolidada en el ámbito de la arqueología del paisaje, con una especialización en aplicaciones avanzadas de SIG, teledetección e inteligencia artificial. Actualmente dirijo la Unidad de Investigación Arqueológica (Núcleo de Investigação Arqueológica, NIA) en ERA Arqueologia, en Portugal, donde desempeño funciones como especialista en tecnologías geoespaciales, favoreciendo la articulación entre la industria, el ámbito académico y la investigación científica.

Mi formación académica incluye una licenciatura en Arqueología por la Universidade do Minho (Portugal) y un DEA en Arqueología por la Universidad de Santiago de Compostela (España), complementada con una especialización técnica a través de un máster en SIG por la Universidade de Porto (Portugal). En 2015 completé mi doctorado en Arqueología en la Universidad de Santiago de Compostela, con el apoyo de una beca predoctoral competitiva de la FCT. Mi investigación doctoral proporcionó información fundamental sobre la transición de la Edad del Hierro al periodo romano en el noroeste ibérico, empleando una perspectiva integrada de arqueología del paisaje y tecnologías geoespaciales.

Mi carrera se distingue por mi éxito en la obtención de financiación internacional competitiva para ampliar significativamente mis líneas de investigación. Tras mi doctorado, me concedieron una beca posdoctoral de la Xunta de Galicia en el Incipit-CSIC, lo que me permitió realizar estudios comparativos cruciales sobre los paisajes romanos y su interacción con las comunidades nativas del noroeste de la Península Ibérica, el suroeste de Inglaterra y Dacia (Rumanía). Esto incluyó una estancia de investigación de dos años en el Departamento de Arqueología de la Universidad de Exeter (Reino Unido). Este trabajo me llevó a obtener una prestigiosa beca postdoctoral Marie Skłodowska-Curie en ese mismo departamento. Mi proyecto MSCA se centró en la investigación de paisajes marginales a lo largo de las fronteras del Imperio Romano a través de una perspectiva comparativa entre el noroeste de la Península Ibérica y el suroeste de Inglaterra.

Mi trabajo reciente integra la inteligencia artificial con la teledetección para la detección automatizada de yacimientos arqueológicos. Este enfoque interdisciplinario representa un importante avance metodológico en este campo. Mi experiencia y liderazgo quedan patentes en mi participación como IP y miembro del equipo en numerosos proyectos competitivos financiados por la Comisión Europea y gobiernos nacionales.

Mi impacto académico se refleja en la publicación de más de 40 artículos en revistas de gran impacto y capítulos de libros, que en conjunto han acumulado más de 1265 citas (Google Scholar) y han generado una importante cobertura mediática. Además, he contribuido a la docencia en instituciones de renombre, como la Universidad de Exeter, el CSIC y varias universidades portuguesas y españolas, además de supervisar activamente a estudiantes de máster y doctorado. Mi reputación como experto destacado se ve reforzada por mi papel como revisor de revistas científicas de primer orden, como Nature, Journal of Archaeological Science, Antiquity, Journal of Roman Archaeology, y Archaeological Prospection, lo que subraya mi influencia en la calidad y el impacto de la investigación dentro de las comunidades arqueológica y geoespacial.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: COSTERO QUIROGA, SONSOLES
Referencia: RYC2025-055869-I
Correo Electrónico: sonsoles.costero@gmail.com
Título: Intellectual Networks, Cultural Mediation, and Knowledge Transmission in Late Antiquity

Resumen de la Memoria:

The researcher's trajectory is characterised by a sustained commitment to reinterpreting the social and cultural history of intellectuals in Late Antiquity through an interdisciplinary approach that integrates Ancient History, Philosophy, Philology, and, more recently, Digital Humanities. Her work has consistently examined how intellectual authority ("paideia") was constructed, transmitted, and mobilised across different communities of the Late Roman and early Byzantine worlds, with particular attention to the schools of Athens and Alexandria and their influence on elite identity, political rhetoric, and cultural memory.

Her early research contributed to the study of the theios anēr (̑divine man̑), offering new interpretations of Proclus and the Neoplatonic milieu in Athens. This phase led to several peer-reviewed publications and participation in major competitive projects, establishing her as a specialist in the cultural representation of philosophers and the mechanisms through which intellectual exemplarity structured ancient education. Her doctoral thesis, awarded the RADE National Prize and the Extraordinary Doctorate Prize, advanced a novel methodology that connected philosophical texts with their broader social contexts, demonstrating how metaphysical arguments encode the concerns, negotiations, and aspirations of Late Antique elites.

A second stage of her trajectory expanded the chronological and geographical scope of her work. Through postdoctoral positions in Germany (CRC 923 Threatened Orders and DFG-Kolleg-Forschungsgruppe 2496 Migration und Mobilität, both at Tübingen, Germany), she explored the networks, mobility, and social functions of philosophers in Late Antiquity and the early medieval period. During this period, she published innovative studies on Porphyry, Theophylact Simocatta, and the rhetoric of imperial power, identifying new evidence for the transmission of Alexandrian intellectual traditions into early Byzantine political discourse. A Q1 article in Classical Quarterly consolidates this broadened scope and demonstrates the international relevance of her contributions.

Her trajectory is also defined by strong leadership and internationalisation. She has served as Principal Investigator of a national research project and Co-PI of a European-funded project (Bearers of Knowledge and Networks of Education), supervised pre- and postdoctoral researchers, and coordinated international collaborations in Switzerland, Germany, Canada, and Spain. Her forthcoming role as Research Fellow and Volume Editor in the Ancient Commentators Project further reflects her position within global research networks.

Building on this solid foundation, the proposed research line aims to integrate Digital Humanities into the study of intellectual networks, using tools such as Recogito and Nodegoat to map geographical references, visualise relational data, and create an open-access database following FAIR and Open Science principles. This methodological innovation will support three objectives: (1) analysing networks around Late Antique philosophical centres; (2) interpreting intellectuals as cultural brokers between political, religious, and educational spheres; and (3) tracing the transmission and adaptation of ideas from Alexandria to Constantinople, Syria, Armenia, and the early Islamic world.

Resumen del Currículum Vitae:

The researcher is a specialist in the social and cultural history of Late Antique intellectuals, with an interdisciplinary background that combines Ancient History, Philosophy, Philology, and Digital Humanities. She earned her PhD from the Autonomous University of Madrid with Sobresaliente Cum Laude, International Mention, and two national awards: the RADE National Prize and the Extraordinary Doctorate Prize. Her academic training includes degrees in Philosophy, History of Antiquity, and Secondary Education.

Her international trajectory encompasses research stays and contracts in Germany, Switzerland, Italy, South Korea, the United Kingdom, the United States, and Canada. She has held five postdoctoral positions, including fellowships in the prestigious DFG research centre Migration und Mobilität in Spätantike und Frühmittelalter (Tübingen, Germany), the CRC923 Threatened Orders cluster (Tübingen, Germany), and her current Juan de la Cierva fellowship at the Complutense University of Madrid. In 2026 she will join the renowned Ancient Commentators Project as Research Fellow and Volume Editor, coordinating scholarly activities across several continents (UBC, Canada).

Her research output includes two monographs (DeGruyterBrill and Bloomsbury, both in press), Q1, Q3, and Q4 journal articles, and numerous book chapters. She has presented invited lectures at leading international forums, moderated panels, and organised more than twenty international conferences and workshops. Her work consistently bridges intellectual history, philosophy, reception studies, and cultural history, with growing emphasis on prosopography and network analysis.

She has demonstrated leadership through her role as Principal Investigator of a national research project derived from Juan de la Cierva and Co-Principal Investigator of the Europa-funded project "Bearers of Knowledge and Networks of Education", supervising doctoral and postdoctoral researchers and developing an open-access prosopographical database. She has successfully managed research budgets exceeding €383,000 and coordinated international teams working on Late Antique thought, education, and cultural transmission.

Her profile also includes significant public engagement: a weekly national newspaper column on women's history in La Razón national newspaper, contributions to radio and podcasts, organisation of public outreach events, and content creation on escuelastardoantiguas.com. She speaks eight languages and is a first-generation academic, which enhances the inclusivity and international reach of her work.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

Overall, her trajectory is marked by intellectual originality, international excellence, strong leadership, and an expanding interdisciplinary impact within Late Antique, Byzantine, and Digital Humanities studies.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología

Nombre: AGUILAR LÓPEZ-BARAJAS, JOSÉ LUIS

Referencia: RYC2025-054323-I

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Título: historia

Resumen de la Memoria:

I am the author of 37 publications: 3 books, 20 indexed articles, 10 book chapters and 4 reviews. The areas my work covers are intellectual history, the history of medicine, the history of tourism, and history from below.

My approach modern European history integrated these themes in transnational and global frameworks and focus regionally on two European "semi-peripheries": East-Central and Southern Europe. My first objective is to integrate these regions into a broader historical landscape and challenge prevailing narratives that, on the one hand, portray post-1945 socialist countries as either isolated or fully aligned with the Soviet Union, and, on the other, present Spanish modern history as fundamentally distinct from the rest of Europe. My research demonstrates that both East-Central and Southern Europe were not only part of a global landscape, but also actively helped drive global history forward. My second objective is to contribute to the comparative history of European dictatorships. In this area, I have developed innovative frameworks in two complementary ways. First, at the level of experts and their relationship to dictatorships; second, from the perspective of "history from below", examining how authoritarian regimes sought to control populations and, in turn, how people acted and lived under such regimes.

I combine the perspectives of global and comparative history with a strong sociological focus. By complementing history with sociology, I have been able to challenge strong arguments about how Cold War intellectual knowledge production worked, or how medicine functions in a socialist system (East Germany). This serves both to assert myself in the field by proposing original interpretations of already-known topics, and also to put forward a methodological intervention that aims to overhaul traditional ways of writing history.

In the project I intend to carry out within the Ramón y Cajal contract, I aim to push my research forward in these directions. The project: "Medicine from the 'margins'. A comparative and global history of healthcare expertise in the Second half of 20th Century Southern and East-Central Europe" brings together two European "semi-peripheries" that similarly suffer a double epistemic injustice: they are both traditionally marginalized in general accounts and often portrayed as backward outposts. This issue is particularly relevant in the realm of medicine, a flagship science whose development is widely regarded as a key marker of modernity, while its absence is commonly taken to signal backwardness. I aim to rethink twentieth-century Europe through the lens of Southern and East-Central European medicine by employing a dual, complementary global and comparative perspective. With regard to the global, I seek to situate Southern and East-Central Europe within a broader international landscape and to examine how, and to what extent, experts from these regions contributed to global debates on medicine. As for the comparison, I will employ a framework drawing on the notion of reciprocal comparison, in which political systems are measured against one another to identify both commonalities and divergences.

Resumen del Currículum Vitae:

I am a historian of modern Europe specializing in intellectual history, the history of tourism, medical history, and history from below in the twentieth century. In these fields, I have published in high-ranking international journals. I have worked or held research fellowships in Spain, Poland, Hungary, the Czech Republic, Slovenia, and Germany. What most distinguishes my trajectory is its geographical orientation: as a Spanish historian trained in East-Central Europe, I bridge Eastern and Southern European perspectives and approach Europe's past from the vantage point of these two "semi-peripheries." This positioning enables reciprocal comparisons and the integration of both regions into wider global frameworks.

In 2022, I defended my PhD dissertation, *The Civilization of Leisure. Spain, East Germany, Europe and the Quest for Modern Tourism*, which received Summa Cum Laude. It pioneered a comparative and transnational history of tourism in Spain and the German Democratic Republic. My scholarship centers on modern European history, particularly authoritarian regimes and their legacies, now expanding toward gender history and the history of experts and scientific knowledge. My key contribution lies in challenging Western-centric narratives by showing that, in medicine, tourism, and knowledge production, Eastern and Southern Europe were not peripheral but played a crucial role in shaping modern Europe.

Although I completed my PhD only three years ago, I have published (or have accepted for publication) seventeen academic articles—thirteen in English and four in Spanish. Twelve appear in first-quartile (Q1) journals, three in Q2, and one in Q3. One article was selected for the Spotlight Series of *Contemporary European History*, the flagship journal of the field—a series reserved for contributions that push disciplinary boundaries and in which no scholar at my career stage had previously been featured. Since 2022, I have also published two books (one co-authored) with Sílex and Siglo XXI. The latter has had editions in Argentina and Spain and has sold over 2,000 copies.

I have obtained six competitive fellowships and several additional grants. I have participated in nine research projects and networks—three national and six international. Through international collaboration, I have co-authored articles with a dozen researchers from six countries and, as first author, have published (or have work under evaluation) with ten researchers from five countries. I have presented my work at workshops and conferences hosted by leading institutions, including the European University Institute, Central European University, and major international conferences in the history of science, medicine, and Eastern Europe. Beyond research, I have taken on coordination duties in two international projects, and in one project currently under evaluation I have applied as Principal Investigator. In 2024, I received the accessit to the I Prize of Conversación sobre Historia and was a finalist for the V4 Young Researcher Award. My linguistic skills (fluency in Spanish, German, Italian, and English, plus reading knowledge of French and Polish) enable me to work effectively across diverse academic and non-academic communities.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: NUNES PEREIRA, DANIELA SOFIA
Referencia: RYC2025-054440-I
Correo Electrónico: dani_sofia@hotmail.com
Título: MERCURIO: Markets, Exchanges, Regulation, Circulation, Urbanism, and the Invisible Order in iberian colonial cities (15th-18th centuries)

Resumen de la Memoria:

My academic trajectory has developed around a coherent, independent research agenda, centred on the structural analysis of market spaces as devices of organisation, regulation, and segregation in Iberian and colonial cities between the fifteenth and eighteenth centuries. With a background in History (University of Évora, 2021), Art History (University of the Algarve, 2012; NOVA University Lisbon, 2022), and Urban Studies, I have developed an interdisciplinary methodology that brings together architectural vocabulary, urban morphology, and normative sources to reconstruct the mechanisms through which markets shaped circulation, urban form, and power dynamics. This approach moves beyond typological or descriptive readings, offering instead an analytical critique of market infrastructures as expressions of inequality, informal practices, and tensions between imperial norms and local uses.

This line of research, initiated during my FCT/UNESCO-funded PhD (2015–2021) and deepened through postdoctoral contracts awarded through highly competitive calls in Portugal (FCT, 2022), Spain (Juan de la Cierva–Formación AEI, 2023–2024), and the United Kingdom (Marie Skłodowska-Curie Postdoctoral Fellowship, 2025–2027), has resulted in internationally recognised outcomes, including two monographs (one published by Routledge in 2025), and the successful attraction of over €500,000 in research funding as Principal Investigator. My work has contributed to renewing the Urban History of the Iberian world by highlighting the structural role of marginalised actors (women, enslaved people, Indigenous and mixed-race populations) in shaping market spaces through informal practices often absent from official records.

The originality and maturity of this research agenda have enabled me to lead five funded projects as PI: FCT Doctoral Grant (2015–2021), FCT Postdoctoral Grant (2022), Juan de la Cierva–Formación (AEI, 2023–2024), Marie Skłodowska-Curie Fellowship (2025–2027), and CEEC Individual Junior Researcher (FCT, 2027–2030). These grants not only demonstrate my capacity to compete in distinct national and European systems, but also sustained the creation of a lasting scientific infrastructure: the international editorial series Marketplaces in Iberian-Connected Worlds (Brepols, 2025–2029), which brings together over 30 leading scholars worldwide.

The project I now propose–MERCURIO–builds upon this trajectory to introduce a decisive analytical shift: from typological analysis to a structural critique of markets as devices of segregation, regulation, and resistance. It seeks to understand how urban markets functioned as spaces of tension between imperial norms and local practices, shaping colonial cities in the Americas, Africa, and Asia.

Combining Urban History, Colonial Studies, economic analysis, and digital tools (GIS, FAIR data), the project offers a comparative and transcontinental reading of market infrastructures and their social implications. It aims to consolidate a long-term research agenda with international ambition, supporting a future ERC application while strengthening the global visibility of the host institution in the fields of Urban and Colonial History.

Resumen del Currículum Vitae:

I am an independent researcher with 17 years of experience, mobility across four countries, and a trajectory spanning seven centres of excellence, specialising in Urban History, Commercial Architecture, and Colonial Studies (15th–18th centuries). My academic development is structured around an original and methodologically rigorous contribution: the study of marketplaces as concealed structures within Iberian and Ibero-American cities, reconstructing commercial practices absent from the sources through lexical–architectural analysis, urban morphology, and urban regulations. This line of research has generated high-impact results and consolidated an autonomous and recognisable scholarly agenda.

I have demonstrated exceptional capacity to secure competitive funding, obtaining more than €500,000 as Principal Investigator in five projects, all awarded on first submission. Particularly notable are the MSCA-PF (University of Exeter, 95.8%, €276k), the CEEC-FCT (89.98%, €92k), and the Juan de la Cierva contract (€69k, UCM).

My scholarly output comprises 41 publications, 20 of them as sole author, along with two single-authored monographs. The 2025 monograph (Routledge, 346 pp.), catalogued in more than 100 university libraries, constitutes the first systematic study of the architecture and spatial configurations of marketplaces in Iberian cities between the late Middle Ages and the early modern period. My most significant conceptual contribution is the formulation of the ‘invisible market’ methodology, presented in an article accepted by a leading international Urban History journal.

My leadership also extends to international scholarly infrastructures. I am the principal editor of the editorial series Marketplaces in Iberian-Connected Worlds (Brepols), with 20 specialists from institutions such as the EUI, Johns Hopkins, and IUAV serving as scientific advisers.

My career has been recognised with the British Academy Global Talent Visa (UK, 2025) in the Exceptional Promise category. I have teaching experience with full pedagogical autonomy at the Complutense University of Madrid (2023–2025), and I have participated in international doctoral examination committees. My knowledge-exchange activity includes leading authorship of the INTERREG project (three open-access books and a database), academic consultancy for a documentary on the ARTE TV channel, and evaluation work for the Ministry of Culture.

Strategic mobility has strengthened a research trajectory with global projection, grounded in comparative and interdisciplinary methods.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: FERNÁNDEZ GARCÍA, MÓNICA
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Correo Electrónico: monica.fernandez.garcia.90@gmail.com
Título:  New horizons in biomolecular research: Paleolithic human paleoecology in Eurasia

Resumen de la Memoria:

My research centers on characterizing the ecology and climate associated with Paleolithic human dynamics in Western Europe. I am particularly interested in reconstructing climate within archaeological contexts, to establish connections between the environment and human subsistence patterns. I have addressed this through bioarchaeological studies, centred on faunal remains (both small and large mammals), integrating disciplines such as taxonomy, taphonomy, and biochemistry. My research interests are directed towards distinct periods, including the Middle Paleolithic and the Upper Paleolithic. All the research interests open along my scientific career have allowed me to reach a high degree of independence based on an interdisciplinary and integrated approach to understanding the complex interactions between prehistoric populations, particularly Paleolithic groups, and past climate fluctuations.

Following advancements in European bioarchaeology, I developed an innovative application of biochemical studies to past vertebrate faunas for reconstructing climate. This last supposed a breakthrough in my career and change of approach to my field, allowing new professional opportunities. I have gradually gained leadership and independence, by my participation in several research projects (1 ERC, 5 national and 15 autonomic) and 7 research groups (including 1 French research unit). In some I led outstanding lines of research, such as Work Package 2 in the ERC project and in national projects. I lead as PI one emerging research group (Generalitat Valenciana) and one research project (Fundación Palarq). Also, through the implementation of a Micropaleontology Laboratory (IPHES) and a Biochemical Laboratory (EvoAdapta group). Currently, I hold a MSCA ID (NEANSCAPES). I have made substantial contributions to the academic community through my publication record (22 in indexed journals, 3 preprints, 6 articles in other peer-review), 15 in open access and leading 12 of them.

The internalization of my research is attested by my dense national and international networking, built during my international PhD (Erasmus Mundus; UNIFE&MNH) and my postdoc within the ERC Project (U. Cantabria), which continuous in U. Valencia. I underwent research PhD stays (U. Claude Bernard) and postdoc stays (U. Cambridge). I participated with 48 contributions to conferences, with 32 in international conferences, some of major prestige in Prehistory, Archeology and Paleontology (UISPP, EAA, EAVP). I co-organized 2 conference sessions (JIA, EAA) and 2 international conferences (ERC, ICAZ-MVWG). I was invited as a recognized expert in international lectures (iNEAL, TaphEN, Human origins group). I coordinated an special volume in the JAS:Reports, as guest editor. I am organizing an EAA session and AEA conference (2026).

The new scientific stage provided by RyC would allow me to integrate of all the acquired knowledge. My current research plan is to establish and consolidate a bioarchaeological research group in Spain dedicated to Palaeolithic Archaeology. This includes the implementation of a stable isotopes laboratory, expanding my international collaboration network, securing national and international funding, and mentoring young researchers. My versatile profile allows me to address and transfer a wide variety of scientific issues in Paleolithic bioarchaeological.

Resumen del Currículum Vitae:

My doctoral research was based at Università degli Studi di Ferrara (Italy) and Museum national d'Histoire naturelle (France), funded by an Erasmus Mundus grant (2019). My PhD focused on the environmental reconstruction of the Middle Paleolithic in Iberia, characterizing late Neanderthal occupations. It was based on small-mammal assemblages recovered from archaeological sites through an interdisciplinary approach including taxonomy, taphonomy and biochemistry analyses. My research introduced a pioneering use of stable isotopes in vertebrate teeth for reconstructing the Quaternary paleoenvironment in Iberia. I developed a novel methodology to quantify climatic parameters adapted to this geographical context, with potential application to other fossil sites, thanks to my collaboration with C. Lécuyer (U. Claude Bernard), through a scientific stay.

Afterwards, as postdoctoral researcher within the SUBSILIENCE ERC project (EvoAdapta Group, U. Cantabria), my role was coordinating the Work-Package associated with the analysis of stable isotopes (oxygen, carbon, nitrogen, sulfur, strontium) from ungulate remains recovered in Middle-to-Upper Paleolithic sites. The main objective was the climatic reconstruction of the southern European peninsulas (Iberian, Italic and Balkans) for a better understanding of the climatic causality on the disappearance of the Neanderthal species. I received scientific advice from T. O'Connell (Univ. Cambridge) and K. Britton (Aberdeen Univ.), experiencing a two-month stay at the former dedicated to implementing new protocols for the stable isotopes analysis in our clean-lab.

In the Dpt. Prehistòria, Arqueologia i Història Antiga (Univ. Valencia; funded by APOSTD grant), my postdoctoral research focus on the study of human adaptations to the climate changes during the Last Glacial Maximum in the Mediterranean area, improving the application of stable isotope analyses in small-mammal assemblages. Currently, I have MSCA-IF (NEANSCAPES, 2025-2027, U. Lancashire) to investigate how Neanderthals adapted to MIS 4 through multi-isotopic analyses and spatial modelling, with a secondment at the Spatial Group (U. Utah).

The relevance of my research is proved by the outcomes reflected in 48 scientific publications (h-index=12; citations=363) and participation in 42 national and international conferences, co-organizing 2 international conferences and 2 conference session. I was invited to present my research at international workshops. I possess teaching experience (URV, UV), I supervised 1 master thesis and participated in the PALPROX MSCA Doctoral School, I participated in 1 university extension course (UNED) and 1 education innovation project. I have the Profesor Ayudante Doctor (ANECA) and Acreditació de Recerca (AQU). I regularly participated in scientific dissemination (Semana de la Ciencia; European Researchers' Night, Expociencia), gender balance initiatives (International Day of Women and Girls in Science) and outreach activities (radio, podcasts). Regular work as reviewer for international journals (AAS, Palaeo3, QR, SJP) and as guest editor for the Journal of Archaeological Science: Reports. I am member in several scientific associations. I excavated in 20 different archaeological sites, overseeing the faunal recovery in some, and I led the setting-up of the Micropaleontology Laboratory at IPHES (2019-2021).



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: LICERAS GARRIDO, RAQUEL
Referencia: RYC2025-054268-I
Correo Electrónico: raquel.liceras@gmail.com
Título: Discursos arqueológicos, identidades y cultura material en las comunidades del I milenio a.n.e.
Resumen de la Memoria:

Mi trayectoria investigadora se centra en la arqueología social del I milenio a.n.e., desde una perspectiva diacrónica e interseccional orientada a comprender la construcción de identidades, relaciones y dinámicas de poder en las comunidades del centro peninsular, actualmente incorporando ambas submesetas. Este enfoque combina el análisis crítico de los discursos arqueológicos con el estudio de la cultura material, integrando metodologías digitales y análisis arqueométricos que aportan una visión amplia y articulada del registro.

A lo largo de mi carrera he consolidado una línea de investigación coherente sobre identidades y poder en las sociedades protohistóricas y en la primera romanización, articulada en cuatro ámbitos principales. En urbanismo y paisaje, mis trabajos en la meseta norte han demostrado cómo las dinámicas de poder y las identidades étnicas se expresan mediante la organización del territorio y los paisajes simbólicos. En identidades de clase, edad y género, he analizado la construcción social de estos grupos a partir de evidencias domésticas, funerarias, textuales e iconográficas, aportando interpretaciones innovadoras sobre colectivos históricamente marginalizados [mujeres e infancia] y su papel en la cohesión y negociación social. En humanidades digitales, he introducido técnicas computacionales para detectar estereotipos, patrones de representación y aportaciones invisibilizadas, desarrollando bases de datos y herramientas que han renovado los marcos analíticos tradicionales. Finalmente, en Numancia he asumido la continuidad de su investigación, impulsando estudios de contextos domésticos y funerarios y coordinando la próxima publicación integral de los materiales procedentes de las excavaciones y prospecciones dirigidas por el Prof. Jimeno.

Mi marco metodológico integra análisis textuales, estudios espaciales y ciencias arqueológicas. La lingüística de corpus permite examinar cómo se construyen las narrativas arqueológicas contemporáneas y detectar sesgos, especialmente de género; los sistemas de información geográfica añaden una dimensión espacial a estos discursos; y los estudios bioantropológicos cuestionan la asignación biológica del sexo y permiten contrastar directamente las categorías sociales presentes en la literatura académica.

El enfoque se desarrolla en dos niveles complementarios. El primero analiza las narrativas arqueológicas mediante "distant reading", para identificar tendencias y vacíos, y "close reading", que evalúa la solidez conceptual y argumentativa de los discursos. El segundo estudia directamente las sociedades del pasado, combinando bioarqueología, análisis de cultura material y estudios contextuales para abordar conceptos como persona, negociación social y transformación cultural. Numancia actúa como laboratorio metodológico para validar y transferir este modelo analítico a otros contextos.

La coherencia, continuidad e innovación de esta línea se reflejan en una producción científica consolidada (h4 en Scopus, h10 en Google Scholar; 64 y 285 citas respectivamente). La combinación de enfoques críticos, digitales y arqueométricos sitúa esta trayectoria en una posición sólida para competir en convocatorias nacionales e internacionales y sustenta una agenda de investigación madura, rigurosa y de proyección a largo plazo.

Resumen del Currículum Vitae:

A lo largo de mi trayectoria investigadora, he consolidado una sólida capacidad de liderazgo científico, acreditada por la captación de 630.487,97 € en financiación competitiva [contratos, estancias, proyectos y licitaciones] desde mis primeros años predoctorales. Esta capacidad de gestión ha sustentado el desarrollo continuo de proyectos propios y la consolidación de una agenda investigadora internacional.

Entre 2018 y 2021 fui investigadora postdoctoral en la Universidad de Lancaster, una etapa clave para especializarme en humanidades digitales aplicadas a la Arqueología. Este periodo me permitió introducir metodologías digitales novedosas en el estudio de la arqueología española y sentar las bases de mis primeras líneas de investigación independientes. En 2021 amplí mi experiencia docente como profesora en la Universidad de Edimburgo, fortaleciendo mi proyección internacional.

Mi retorno a la academia española se produjo gracias a un contrato del programa María Zambrano en la Universidad de Salamanca, donde retomé el estudio de la Meseta Norte y asumí la continuidad de las investigaciones en Numancia, un área estratégica de mi investigación. Ese mismo año obtuve un contrato postdoctoral ERC MSCA-2021-PF (STENA) y un contrato de Profesora Ayudante Doctora en la UCM, desde donde dirijo proyectos competitivos (JCyL, Fundación Palarq, Fundación BBVA) centrados en Numancia y en la arqueología del centro peninsular.

Mi producción científica incluye 47 publicaciones con una proporción significativa como autora única o primera autora, lo que evidencia autonomía, liderazgo y continuidad investigadora. En línea con los principios FAIR, priorizo la publicación en acceso abierto y la difusión de datos en repositorios institucionales, reforzando la visibilidad y transparencia de mis resultados. Esta trayectoria ha sido reconocida con un sexenio de investigación (2012-2019).

Mi actividad de difusión es igualmente amplia, con 32 conferencias invitadas en instituciones nacionales e internacionales, 6 charlas de divulgación, 26 comunicaciones revisadas y 8 pósters. He organizado eventos científicos [como el congreso PreProtoArq 2024] y varias mesas redondas y sesiones temáticas, contribuyendo a dinamizar el debate científico. Mi participación en 8 comités de programa y en labores de revisión científica (13 manuscritos en revistas indexadas y 4 libros) refleja una implicación activa en la evaluación de la investigación. También colaboro con la AEI en informes de experta y formé parte de la Comisión de Expertos PHA para las Ayudas Ramón y Cajal 2024.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Desde 2024 soy vocal del Consejo de Redacción de Complutum y, desde 2025, miembro del Comité de Redacción de la serie Mytra. He sido evaluadora externa y miembro de tribunales de tesis doctorales, reforzando mi compromiso con la formación de nuevas generaciones investigadoras.

En el ámbito docente, cuento con las acreditaciones de Profesora Contratada Doctora y Profesora de Universidad Privada (2022), un quinquenio docente (2015-2021) y 1.042 horas impartidas en grados y másteres de la UCM, Lancaster y Edimburgo. Mi experiencia, complementada con docencia invitada y materiales docentes publicados, evidencia una trayectoria docente consolidada y alineada con mi perfil investigador.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: RUIZ DOMINGO, LLEDÓ
Referencia: RYC2025-057247-I
Correo Electrónico: lledo.ruiz.domingo@gmail.com
Título: Queenship, Governance and Political Infrastructures in Late Medieval Europe
Resumen de la Memoria:

Mi trayectoria investigadora se ha centrado en analizar las estructuras económicas, políticas y territoriales que permitieron a las reinas y consortes ejercer funciones de gobernanza en la Europa bajomedieval. Esta orientación surgió ya en mis primeros trabajos sobre crédito, finanzas y administración cortesana, donde identifiqué las bases documentales y relacionales que sustentaban la autoridad femenina. Posteriormente amplí este enfoque hacia las redes políticas, diplomáticas y territoriales que articulaban su capacidad de intervención en múltiples escalas, desde la gestión cotidiana del gobierno hasta la mediación en conflictos y la proyección internacional de las monarquías ibéricas. El uso de bases de datos prosopográficas, análisis espacial e infraestructuras digitales no solo ha reforzado el rigor metodológico de esta línea, sino que ha permitido visibilizar patrones comparativos que conectan a la Corona de Aragón con otras monarquías europeas. El resultado es un marco interpretativo sólido y en expansión, que explica cómo la autoridad femenina se construyó, negoció y ejerció a través de recursos materiales, vínculos de servicio, circulación de información y dispositivos constitucionales como la regencia o la lugartenencia. Mi producción científica incluye cuarenta publicaciones, dos monografías, entre ellas *El Tesoro de la Reina* (CSIC, 2022), galardonada y reconocida internacionalmente, y varios conjuntos de datos abiertos.

Mi periodo postdoctoral de 26 meses en la Universidade de Lisboa consolidó mi independencia científica y la dimensión comparativa de mi investigación. Allí integré métodos digitales (prosopografía estructurada, análisis espacial, visualización de redes), organicé encuentros internacionales, participé en proyectos competitivos y reforcé colaboraciones con centros de referencia. Este periodo dio lugar a publicaciones en revistas Q1, invitaciones en instituciones como Oxford y responsabilidades editoriales en series internacionales. Esta trayectoria me permitió obtener mi primer proyecto competitivo como investigadora principal: REGINET (GVA, 2024), que formaliza mi modelo analítico sobre redes económicas, políticas y diplomáticas de reinas e infantas entre 1350 y 1500. Dirijo un equipo internacional de seis universidades y coordino actividades científicas, monográficos y resultados con impacto internacional.

Mi reconocimiento europeo se ha reforzado con mi incorporación invitada al COST Action CA24164 SENSES (2025-2029), donde formo parte del core group del WG3. Este nombramiento acredita la relevancia de mi contribución a los estudios de cortes y gobernanza y me sitúa en espacios estratégicos de definición de agendas científicas europeas.

Desde 2024 formo parte de la Universitat Jaume I, donde desarrollo docencia, dirijo TFG y TFM y asumiré en 2026 la co-dirección de una tesis FPI. Ocupo responsabilidades editoriales como editora de *Potestas* (Q2) y secretaria electa de *Millars* (Q4), he captado recursos institucionales y co-dirijo la conferencia internacional *Beyond Exceptionalism III* (2026), que será un centro para los debates internacionales sobre monarquía y poder femenino.

Resumen del Currículum Vitae:

Mi trayectoria se ha centrado en el estudio de la historia política y económica de la Europa bajomedieval, con una especialización en el estudio de las formas de gobierno ejercidas por reinas consortes de la Corona de Aragón. Doctora Cum Laude por la Universitat de València (2020), mi aportación principal ha sido formular un modelo analítico que integra una perspectiva económica y políticas para dilucidar cómo estas mujeres de la realeza participaron en la construcción y sostenimiento del poder monárquico. El conjunto de mi producción científica incluye cuarenta publicaciones, dos monografías y varios conjuntos de datos abiertos, lo que evidencia una actividad sostenida, de calidad y con impacto internacional.

Mi monografía *El Tesoro de la Reina* (CSIC, 2022), premiada y reconocida por su renovación metodológica, constituye la primera reconstrucción sistemática de la administración económica de las reinas aragonesas y ha generado bases de datos incorporadas a la plataforma digitales accesibles. Este libro reforzó mi papel dentro de la red internacional *The Queens' Resources*, donde coordino la línea dedicada a la Corona de Aragón. He publicado artículos en revistas Q1 y Q2 de referencia en medievalismo y gobernanza, y he coordinado varios monográficos que contribuyen a estructurar los debates actuales sobre autoridad femenina y prácticas cortesanas.

Cuento con una amplia experiencia internacional que asciende a 38 meses, de los cuales 26 corresponden a un periodo posdoctoral en la Universidade de Lisboa. Esta estancia fue decisiva para consolidar mi independencia científica, profundizar en metodologías digitales y desarrollar una perspectiva comparativa y transnacional sobre la circulación del poder entre cortes europeas. Durante este periodo organicé encuentros internacionales, participé en proyectos competitivos y fortalecí colaboraciones con instituciones de referencia. Además, he sido invitada a presentar mi investigación en foros de alto prestigio, como el seminario *Economic History of Monarchy* de la Universidad de Oxford.

Mi capacidad de liderazgo científico se evidencia en la obtención del proyecto REGINET (GVA, 2024) como investigadora principal, que formaliza mi modelo analítico sobre redes económicas, políticas y diplomáticas de reinas e infantas entre 1350 y 1500. Dirijo un equipo internacional de seis universidades y coordino actividades científicas, publicaciones y resultados de impacto. Este liderazgo ha sido reconocido también a nivel europeo mediante mi incorporación invitada al COST Action CA24164 SENSES - Sensing Europe's Court Spaces (2025-2029).

Desde 2024 formo parte de la Universitat Jaume I, donde desempeño funciones de docencia, dirección de TFG y TFM y, próximamente, co-dirección de una tesis doctoral financiada por una ayuda FPI. Ocupo responsabilidades editoriales como editora de *Potestas* (Q2) y secretaria electa de *Millars* (Q4), y participo en órganos académicos vinculados a la actividad investigadora. He captado recursos institucionales, impulsado iniciativas de



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

innovación docente y co-dirijo la conferencia internacional Beyond Exceptionalism III, que se celebrará en UJI en 2026 y situará a la institución en un lugar destacado dentro de los estudios de gobernanza medieval y realeza femenina.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: SZCZYGIELSKA, MARIANNA
Referencia: RYC2025-056108-I
Correo Electrónico: szczygielska@eu.cas.cz
Título: History of species conservation and gender history

Resumen de la Memoria:

I am a historian of science and environment specializing in human-animal relations. My contributions to the field can be organized into 3 research lines: (A) Zoological collections and colonial wildlife trade in the 19th and 20th centuries. I have developed this research line for over 10 years, spearheading novel approaches to studying natural history collecting and wildlife trade from gender and intersectional perspectives. (B) Veterinary expertise and disease control in Europe (1860-2020). Veterinary humanities is an emerging field of study that explores animal and human health within a shared social context. My contribution to this interdisciplinary new field offers a history of science perspective on the nexus of veterinary expertise, animals, and society. (C) De-extinction and species reintroduction in interwar Europe. This latest line of research builds on my expertise in the history of nature conservation in Central and Eastern Europe. It complements my research of zoological gardens and exotic wildlife trade with other areas of interest such as the history of national parks movement in Europe and the preservation of native species.

The line of research I propose to develop during my RyC contract concerns the history of women in species conservation in postwar Europe. In the aftermath of World War II, the nascent international movement in nature conservation faced changing paradigms of protecting species endangered with extinction. With the onset of decolonization and the Cold War, national parks and nature reserves protected animals' natural habitats as part of in-situ conservation efforts, while zoological gardens turned to captive breeding, thus, making ex-situ conservation their main rationale at a time when they could no longer rely on colonial animal trade. The project reconsiders how conservation knowledge and practices were shaped not only by shifting ecological paradigms and geopolitical transformations, but also by the entry and labor of women—scientists, technicians, caregivers, and activists—into a field traditionally dominated by men. It focuses on the biographies of four women whose scientific and popularizing work became central to the protection of endangered species in Europe and globally. Through four case studies, my project will explore the postwar history of modern conservation to bridge the gender gap in the current international literature on the nature protection movement. Combining my expertise in gender studies and the history of science, I aim to reframe conservation as a site of gendered knowledge production by examining the institutional, epistemic, and social conditions that enabled these interventions. This project will contribute to different historiographies: (a) gender and science, (b) international nature conservation, (c) Cold War, (d) human-animal relations, (e) zoos and national parks, (f) history of science in CEE, and (h) science communication. This project will serve as the foundation for an ERC Starting Grant application, "Gendered Ecologies: Knowledge and Labor in the Making of Postwar Conservation," through which I aim to establish a research team and build a new transnational agenda on the gendered infrastructures of conservation science and practice, including Spanish case studies.

Resumen del Currículum Vitae:

With more than 12 years of research experience, I am a leading expert in animal history and gender studies. Through competitive funding schemes, I have developed an international and interdisciplinary profile. My publishing record is strong (17 peer-reviewed articles; 8 chapters in edited volumes; 3 co-edited Special Issues, 2 forthcoming; 1 co-edited book; 1 monograph under contract). My h-index is 9 and my i10-index is 9. My work has opened new research directions at the intersection of the history of science, feminist science studies, and environmental humanities. My PhD was the first comprehensive study of scientific and cultural discourses on same-sex sexual behavior in zoo animals, generating a methodological framework linking the history of science with sexuality and gender studies. My monograph is under contract with Washington University Press, in the field-defining series "Feminist Technosciences." A second line of inquiry emerged through my project on colonial elephant and ivory trade in Eastern Europe (1850-1945), funded by a prestigious fellowship at the Max Planck Institute for the History of Science. My research demonstrated how elephant bodies mediated racialized knowledge and commodity networks, contributing to decolonial perspectives in EEC. It led to 4 single-authored articles in indexed journals. My BOAR ERC postdoctoral work expanded my expertise to the history of veterinary medicine, wildlife management, and disease control. I developed new concepts, such as the "epistemic reservoir" and pioneered work on gendered labor in animal slaughter, and co-edited an upcoming special issue on veterinary infrastructures, consolidating my leadership in interdisciplinary scholarship. I have gained extensive archival, ethnographic, and analytical expertise; coordinated collaborative publications; secured competitive funding; and built strong international networks. My work consistently generates new hypotheses, research lines, and conceptual tools advancing the study of species conservation, gender, and human-animal relations. My research has generated substantial societal impact through sustained public engagement and collaborations with museums, cultural institutions, and heritage organizations. I have presented my work at over 30 conferences in 16 countries and given numerous public lectures. I collaborate with public institutions including the Natural History Museums in Berlin, Wrocław, and Kraków, Haus der Kulturen der Welt, and National Gallery Prague, translating scholarship into public programs. I curate science-art initiatives, including a major 2024 exhibition at the Natural History Museum in Kraków, and serve on the Program Council of the Baltic Gallery of Contemporary Art. In 2024, I was commissioned by ICOMOS to review a World Heritage List nomination on 19th-century zoological gardens. I have a strong record mentoring early-career researchers (2 PhD students). I supervised 2 MA theses—one leading to a fully funded PhD and Doctoral Recruitment Award at the University of Toronto—and 1 BA thesis. I advise postdocs and PhD fellows at MPIWG, and contribute to departmental training. I served as Postdoctoral Representative at MPIWG (2020-21) and currently chair the Diversity Committee of the European Society for Environmental History. I play an active role in research evaluation.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: SANTOS DA ROSA , NEEMIAS
Referencia: RYC2025-056859-I
Correo Electrónico: neemias.sdarosa@gmail.com
Título: Prehistoric Art as Cognitive Technology: Experimental and Archaeometric Approaches

Resumen de la Memoria:

The line of research I propose to develop during the grant focuses on the experimental archaeology and archaeometry of rock art and portable art as symbolic technologies and external memory systems that scaffold cognition and cultural transmission. Its overarching aim is to understand how images painted and engraved on rock surfaces and portable supports were designed, produced and used to stabilise knowledge, structure attention, support memory and guide action, and how their material properties conditioned specific forms of perception, cognitive processing and communication. This line builds on my expertise in technology, taphonomy and sensory archaeology, but moves a step further by explicitly foregrounding prehistoric images and artefacts as cognitive tools—rather than considering them only in terms of their aesthetic, stylistic or iconographic features, as much of the literature has traditionally done. In this sense, it will focus especially on Palaeolithic and Holocene evidence from Europe, Africa and South America—regions where I already have experience and collaborations—in order to examine how different societies deployed rock art and portable art as devices explicitly crafted to support complex thought across diverse ecological and social settings. This comparative perspective will make it possible to identify both shared principles and historically contingent solutions in the cognitive use of prehistoric art, thereby shedding new light on the role of symbolic media in the behavioural evolution of Homo sapiens. To operationalise this programme, I will combine three interconnected approaches. First, I will design and implement experimental and archaeometric studies that reconstruct complete chaînes opératoires for selected assemblages, determining how technical choices shape the resulting images and artefacts, their durability and their trajectories of taphonomic alteration. This will characterise the techno-visual properties through which symbolic information was materialised and bridge what prehistoric artists may have produced with what has reached the archaeological record. Second, building on this baseline and in collaboration with neuroscientists, I will develop cognitive experiments to investigate how prehistoric art with these techno-visual properties is processed by the human brain, assess its effectiveness for encoding, retaining and transmitting symbolic information over different timescales, and explore how degradation affects its efficiency as a medium of communication. Third, I will integrate the resulting datasets into comparative models that juxtapose Palaeolithic and Holocene case studies from the three study areas, determining the extent to which the production and use of prehistoric art shaped collective cognition and underpinned cultural transmission processes. This research line will have scientific and methodological impact. It will reframe prehistoric art as a suite of cognitive tools materialised through symbolic technologies, offering an account of how painted and engraved images contributed to the evolution of human behaviour. It will also consolidate and refine experimental and archaeometric protocols transferable to other sites and collections, strengthening the analytical toolkit for prehistoric imagery and providing common ground between archaeological questions and cognitive-science models.

Resumen del Currículum Vitae:

I am an archaeologist specialising in experimental and archaeometric approaches to prehistoric art, developing innovative protocols to analyse and model the technological and taphonomic dimensions of painted and engraved remains and exploring their cognitive implications for the evolution of human symbolic behaviour across diverse prehistoric contexts. I have played key roles in 35 research projects (PI/Co-PI 6; 30 competitive) spanning study areas in nine countries across Europe, Africa, Asia, North America and South America. These projects have strengthened my leadership and provided extensive fieldwork experience through the coordination of studies at more than 200 sites. They have also enabled close collaboration with leading scholars and partnerships with world-renowned institutions. Throughout my career, I have demonstrated scientific independence and leadership by securing 444,809 € in competitive funding, including a prestigious Marie Skłodowska-Curie Postdoctoral Fellowship and research contracts on two major ERC-funded projects: the Artsoundscapes and the Synergy QUANTA. Leveraging these resources, I have established an independent research line and conducted studies on topics such as the techniques used to produce engravings in the Tagus Valley; the paint recipes and tools employed in the creation of Levantine paintings; the chemical composition of decorations on portable art from Patagonia and Tierra del Fuego; the characterisation and modelling of taphonomic processes affecting paint remains in Blombos Cave and Palaeolithic sites of the Mediterranean and Cantabrian regions; the cognitive impact of the acoustic properties of rock art shelters; and the development of human numerical cognition in the European Palaeolithic through the use of portable art as artificial memory systems. This work has resulted in 149 scientific contributions, including 20 articles in peer-reviewed journals (15 Q1), one special issue, one book, 19 peer-reviewed book chapters, four articles in peer-reviewed conference proceedings, five scientific reports for public administrations, 16 open-access datasets, 64 oral presentations and two posters at conferences, and 10 invited lectures in four countries. Over six years of postdoctoral experience, I have maintained an average output of 5.8 publications per year. The relevance of my work is reflected in 306 citations in Google Scholar (h-index 11, i10-index 14) and a Field-Weighted Citation Impact (FWCI) of 3.04, which rises to 4.49 when considering only my first-author contributions. This profile has led to invitations to serve as an Hon. Research Fellow at the Rock Art Research Institute, University of the Witwatersrand, to join the Nat. Scient. Comm. for Rock Art of ICOMOS Spain, and to act as a peer reviewer for 11 Q1. Beyond these research activities, my contribution to the advancement of archaeology also encompasses the organisation of sessions at major international conferences, as well as the training of early-career researchers. This includes the supervision of three PhD candidates, one MA student and one undergraduate student, and a total of 294 hours of certified teaching experience, notably as lecturer and coordinator of the course “Theory and Methods of Archaeological Science” in the MA in Advanced Studies in Archaeology at the University of Barcelona.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: SÁNCHEZ POLO, ALEJANDRA
Referencia: RYC2025-056665-I
Correo Electrónico: j.sanpol@gmail.com
Título: ARCHAEOLOGY OF DOMESTIC LIFE: CONSTRUCTION, SYMBOLISM, AND SOCIAL PRACTICES IN IBERIAN BRONZE AND EARLY IRON AGES

Resumen de la Memoria:

The candidate's trajectory has focused on domestic ritual practices during the Bronze Age and is now expanding towards the characterization of pigments and building techniques in the I millennium BC inner Iberia. During the Ramón y Cajal contract the candidate will develop a systematic study of construction techniques and maintenance activities in domestic spaces (floor repairs, renewal of renders, cyclical repainting of walls) from the BA to the end of the EIA, combining macroscopic observation and archaeometrical analysis in order to refine the understanding of household social organization.

Prehistoric building techniques in the region have been poorly described and existing studies lack a holistic and theoretically grounded framework. This research programme adopts social and symmetrical archaeologies as its main theoretical pillars and aims to characterize different building traditions by using two complementary approaches with strong heuristic potential: chaînes opératoires and the biography of objects. The project will be guided by two main working hypotheses: 1) BA communities in inland Iberia deliberately maintained a long-standing way of life—deeply rooted in the Chalcolithic—strongly mediated by myth and ritual, living in huts of heterogeneous morphology surrounded by pit fields infilled with refuse and other selected materials. 2) Building change and social change: there were at least 2 phases of transformation in social relations and construction patterns. The first, relatively modest, at the beginning of the BA (2100–1900 BC), served to reinforce this long-lived way of life. The second, far more profound, between the LBA and the EIA (1300–900 BC), saw the accumulation of multiple innovations and indirect connections with Mediterranean and/or continental groups, resulting in entirely new lifeways in the region, characterized by village-based neighbourly relations.

This research, unprecedented in comparative and regional terms, addresses constructional specificities and key social changes that explain the transition to village-based societies anchored to the territory. Drawing on three case studies (the EBA to LBA of the Douro basin and the EIA in the Upper Ebro River as well as the northern plateau), it will include excavations at Los Tolmos (Soria) and El Soto de Medinilla (Valladolid), as well as analyses of architectural remains from sites such as Guaya, and Las Eretas. Different archaeometrical techniques will be applied, such as geoarchaeology, phytolith analysis, XRD, XRF and radiometric dating.

The strategy includes funding through national projects, or the ERC combines fieldwork, museum-based research and laboratory analysis. I will disseminate the results through public talks, temporary exhibitions, high-impact annual publications, a monograph, international conferences and a seminar. This approach will contribute to key debates on Phoenician colonization and the archaeology of maintenance, consolidating my position within studies of earthen architecture.

Resumen del Currículum Vitae:

I am an archaeologist with a strong focus on domesticity in Bronze and Early Iron Age societies of inner Iberia. I began my doctoral research with a competitive predoctoral contract from the Regional Government of Castile and León (2009–14). My PhD, awarded Cum Laude in 2021, has led to a monograph and the forthcoming publication of my thesis (expected 2026). I have obtained accreditation as Profesora Contratada Doctora (ANECA) and the Seal of Excellence from the European Research Council (2025) for achieving >85 points in the recent MSCA call.

My research output includes 1 monograph, three co-edited volumes or Special Issues (two in progress), 31 peer-reviewed articles, 10 book chapters and several book reviews. I increasingly publish in English, enhancing the international visibility of my work. I have presented at 53 conferences and scientific events (17 abroad), and co-organised 4 conferences, 2 EAA sessions (2023–24) and 5 international scientific meetings. Over the past five years I have led 6 projects on the ethnoarchaeology of pastoral societies, colour archaeometry and earthen architecture (€46k), and participated in 9 national and 4 international projects. I currently direct the archaeological interventions at the Bronze Age site of Los Tolmos (Soria) and the hillfort of Icedo (Burgos).

Internationalisation is a central dimension of my trajectory. During my PhD I undertook funded research stays in Canada and Ireland and shorter visits to the USA, France and Spain. Between 2014 and 2018 I worked in Ecuador, conducting field and laboratory research at the National Institute of Cultural Heritage and in a pre-Columbian art museum in Quito, where I curated a temporary exhibition and published in high-impact journals such as Scientific Reports. I have subsequently completed postdoctoral stays at the IMF and ICAC (Spain), the Austrian Academy of Sciences and the British School at Athens. In total I accumulate 73 months (6 years) of international experience. I participate in research networks such as GEPA, ART-GEO and PREHUSAL groups, and I am a member of EAA, SAS, ECRG-OeAI, AWAP and PRI.

I have obtained several competitive national and international fellowships, including a Margarita Salas postdoctoral fellowship (2023, declined), a Juan de la Cierva fellowship (2023–24, UVA), the Fitch Bursary Award at the British School at Athens (2024) and an Incoming Fellowship (2025) from the Austrian Academy of Sciences, raising around €210k in competitive funding. I founded the journal El Futuro del Pasado (Q3, SJR 2024), coordinated Special Issues on microarchaeology and museum decolonisation, and regularly act as a peer-reviewer for leading journals.

My dissemination activities include an award-winning documentary, curated exhibitions in Ecuador and Spain, and around twenty outreach talks. In teaching, I have delivered 10.4 ECTS at the Universities of Valladolid and Salamanca, supervised two undergraduate dissertations and coordinated a teaching-innovation project (2024), whose results are under review and have been presented at 2 conferences; I have also completed an Erasmus+ teaching-training stay in Belgrade (Serbia, 2024). Overall, my trajectory is characterized by strong international engagement, impactful publications, sustained success in attracting competitive funding and proven capacity to lead collaborative projects.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: ORGANISTA LABRADO, ELIA
Referencia: RYC2025-055379-I
Correo Electrónico: eliaorganista77@gmail.com
Título: Acheulean Homo Behaviour at Olduvai Gorge: Taphonomic, Spatial, and AI Insights from BK
Resumen de la Memoria:

My research focuses on reconstructing the behavioural ecology of early Homo, with particular emphasis on Acheulean populations at Olduvai Gorge (Tanzania). Throughout my career, I have developed an interdisciplinary approach that integrates taphonomy, faunal analysis, spatial archaeology, and artificial intelligence to investigate how early hominins interacted with their environments, structured their activities, and shaped the formation of archaeological assemblages. I have published 26 peer-reviewed articles, including several as first author, in high-impact journals such as Scientific Reports, Quaternary Science Reviews, Quaternary International, and Journal of Archaeological Science. My work has received more than 1,000 citations, reflecting its international visibility and relevance.

Since 2020, I have directed the excavations at the Acheulean site of BK (Bed II, Olduvai Gorge) within the TOPPP project, where I lead the design, implementation, and analytical development of the research strategy. BK constitutes the core of my independent research line and provides a unique opportunity to examine Homo erectus behaviour in high-resolution detail. My work at BK combines traditional excavation methods with photogrammetry, spatial statistics, and AI-based classification of bone surface modifications. This integrated analytical framework has produced new insights into subsistence strategies, predator-prey dynamics, site formation processes, and the social and ecological adaptations of Acheulean hominins.

My trajectory demonstrates increasing independence and leadership. I served as Principal Investigator of the Swedish Research Council project AR-HS2018-01045_3, which supported fieldwork and analytical studies of early Homo behaviour at Olduvai Gorge. I have coordinated multidisciplinary teams, managed budgets, and developed innovative methodological protocols that are now applied in different African Paleolithic contexts. I have also established strong international collaborations with institutions such as Stockholm University, CENIEH, IPHES, the University of Cologne, the Globe Institute (Copenhagen), the Max Planck Institute for Geoanthropology, the University of Dar es Salaam, and the Ngorongoro Conservation Area Authority.

My research contributes to society through active collaboration with museums and heritage institutions. I have participated in the design of exhibition materials for the Olduvai Gorge Museum, the National Museum of Tanzania, and the Regional Archaeological and Palaeontological Museum of the Community of Madrid, ensuring that scientific knowledge is accessible to broader audiences. I also contribute to training early-career researchers through specialized teaching in osteology, taphonomy, and archaeological recording techniques, as well as through field and laboratory instruction at Stockholm University, IDEA, and the Olduvai Field School.

My research aims to consolidate BK as a reference site for understanding Acheulean behavioural complexity. Using advanced taphonomic modelling, deep learning tools, biomolecular analyses, and high-resolution spatial datasets, I seek to reconstruct hominin behavioural patterns, technological variability, and ecological decision-making contributing to a deeper understanding of the evolutionary roots of human behaviour.

Resumen del Currículum Vitae:

I hold a PhD in History and Archaeology (Complutense University of Madrid, 2017), an MSc in Prehistoric Research (2006), and a BA in History (2004). My academic and professional development has combined archaeological fieldwork, museum work, laboratory research, and international postdoctoral training. I am currently a Visiting Researcher at Stockholm University's Osteoarchaeological Research Laboratory (since 2023) and a Researcher at the Institute of Evolution in Africa (MARPA/Rice University) since 2012.

My professional trajectory includes extensive experience in European and African archaeology, with long-term specialization in osteology, taphonomy, and the study of early hominin behaviour. Since 2020, I have directed the archaeological excavations at the Acheulean site of BK (Olduvai Gorge, Tanzania), a role that has positioned me as a leading specialist in the behavioural ecology of Homo erectus. Prior to this, I held a postdoctoral position at Stockholm University (2019-2021), where I led a Swedish Research Council-funded project on early Homo behaviour. I also gained experience in museum curation at the Regional Archaeological and Palaeontological Museum of Madrid and completed technical training in topography and photogrammetric surveys.

My career includes periods of professional interruption due to maternity leave (11 months, 2020-2021) and dependent care (2023-2024), fully documented in accordance with evaluation guidelines. Despite these interruptions, I have maintained continuous scientific productivity and international collaboration.

I have authored 26 peer-reviewed articles and three book chapters, with publications in leading journals such as Scientific Reports, Quaternary Science Reviews, and Journal of Archaeological Science. My work has received over 1,000 citations (Google Scholar) with an h-index of 14, reflecting strong international visibility. My publications often incorporate advanced methodological frameworks, including deep learning, spatial statistics, and experimental taphonomy.

In addition to my research activities, I have contributed to academic teaching and methodological training at Stockholm University, the Institute of Evolution in Africa, and the Olduvai Field School, where I have taught excavation techniques, osteology, and taphonomic methods to undergraduate



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



Cofinanciado por
la Unión Europea



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

and graduate students. I have also participated in scientific dissemination and heritage activities through collaborations with the Olduvai Gorge Museum, the National Museum of Tanzania, and the Regional Archaeological and Palaeontological Museum of Madrid.

Throughout my career, I have developed strong international networks collaborating with institutions such as CENIEH, IPHES, University of Cologne, Max Planck Institute for Geoanthropology, Globe Institute Copenhagen, the University of Dar es Salaam, and others. This network supports a research profile that is interdisciplinary, international, and increasingly focused on integrating technological innovation into the study of human evolution.

Overall, my curriculum reflects a solid combination of field leadership, methodological expertise, international mobility, and sustained scientific productivity in the fields of archaeology, taphonomy, and human evolutionary studies.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: PÉREZ YARZA, LORENA
Referencia: RYC2025-055759-I
Correo Electrónico: lorenapy@yahoo.com
Título: PRÁCTICAS RELIGIOSAS, CONTACTO CULTURAL, EPIGRAFÍA Y EN EL MEDITERRÁNEO ROMANO

Resumen de la Memoria:

Desde la obtención de mi doctorado por la Universidad de Zaragoza en 2019, he desarrollado una trayectoria progresivamente autónoma e internacional en Historia Antigua, centrada en el estudio innovador del contacto intercultural en la religión antigua y de sus manifestaciones epigráficas en el Imperio romano. Este enfoque, que parte del reconocimiento de la naturaleza polisémica de los mensajes epigráficos y de su circulación entre comunidades diversas, ha orientado mi investigación hacia la interpretación de amplios repertorios documentales, tal y como reflejan mis publicaciones, la mayoría en inglés y de autoría en solitario. De este modo, una forma adecuada de comprender mis contribuciones es distinguir dos líneas de investigación interrelacionadas:

-En primer lugar, el análisis metodológico, que abarca el dominio de técnicas epigráficas tradicionales (incluida la autopsia), el trabajo numismático y la aplicación de herramientas digitales para la sistematización de fórmulas rituales. Esta línea no se orienta a la publicación de piezas aisladas o inscripciones puntuales; por el contrario, se fundamenta en el tratamiento comparativo de macroconjuntos epigráficos, en el análisis de tendencias y en la evaluación crítica de su variabilidad regional.

-En segundo lugar, los estudios comparativos sociorreligiosos, centrados en el examen de fórmulas onomásticas y repertorios rituales en la Antigüedad grecorromana, con el fin de identificar dinámicas religiosas que varía según el contexto y la región. Esta perspectiva incluye el estudio de inscripciones bilingües, los análisis interregionales (como casos de glocalización o comunidades migrantes sirias) y una aproximación comparativa al culto solar en diversos entornos imperiales.

Resumen del Currículum Vitae:

Desde 2015, mi trayectoria investigadora se ha centrado en el estudio innovador de la religión antigua y la epigrafía. He difundido mis resultados en 38 comunicaciones y ponencias científicas, de las que destaco diez de carácter internacional. Asimismo, he organizado siete eventos académicos (seis internacionales), varias mesas en congresos y he editado ["No tengo en prensa"](#) varios volúmenes colectivos (véase memoria), lo que evidencia tanto mi proyección internacional como mi creciente capacidad de liderazgo. Esta vertiente se refuerza con la organización de actividades vinculadas a proyectos (Polytheism in Nature), así como con las invitaciones a charlas de divulgación/conferencias y mi iniciativa en internacionalización. Desde 2017, los resultados de mi investigación se encuentran disponibles en el corpus digital MAP, DEPHis (Divine Epithets in Hispania) y en diversas publicaciones científicas: una monografía, tres volúmenes editados (y otro como colaboradora), dieciséis artículos y capítulos de libro (10 de ellos en inglés) y varias reseñas, además de dos volúmenes y cinco trabajos adicionales en prensa que ampliarán próximamente los resultados internacionales (ver memoria).

La internacionalización constituye un eje fundamental de mi filosofía profesional. Soy profesora adjunta (adjunkt) en la Universidad de Varsovia dentro del proyecto ERC STONE-MASTERS y he sido investigadora visitante y fellow en instituciones de referencia como la Universidad de Oxford y la Kommission für Alte Geschichte und Epigraphik (DAI, Múnich). Pese a la interrupción derivada de la pandemia de COVID de un breve período de actividad profesional fuera del ámbito académico, he retomado con éxito mi carrera mediante contratos y becas de investigación nacionales e internacionales. He obtenido 19 ayudas competitivas para investigación, movilidad y publicación, con una financiación total (no salarial) superior a 30.000 €. Destacan la Jacobi Stiftung y la WWU Fellowship, así como el contrato Juan de la Cierva ["Formación"](#). Fui también distinguida por la Comisión Europea con el Seal of Excellence (Marie Skłodowska-Curie Actions), reconocimiento que propició mi colaboración con el proyecto ERC MAP (Université de Toulouse) y mi contribución a su base de datos y publicaciones. Mi experiencia internacional supera los 45 meses de actividad e incluye once estancias de investigación en Reino Unido, Italia, Alemania, Francia y Portugal, centradas en el estudio de materiales y el intercambio y transferencia científica. Cuento además con experiencia consolidada en gestión científica como secretaria del grupo Historia e Historiografía de las Religiones (2021-2024) y del grupo Hiberus (2016-2017). Actualmente soy editora y gestora científica del catálogo DEPHis (Open Access), miembro del consejo editorial de la serie Lived Realities in Ancient History (Trivent) y secretaria adjunta de Revista de Historiografía, donde coordino la sección de miscelánea y he contribuido a mejorar el posicionamiento de Q4/Q3 a Q1 (ver memoria). Poseo seis años de experiencia docente en Historia, con enseñanza en español e inglés en grados de la Universidad de Zaragoza y la UC3M, así como en los másteres History of Ancient Mediterranean Civilizations (Varsovia) y Ciencias de las Religiones (interuniversitario).



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: ZAVATTI, FRANCESCO
Referencia: RYC2025-054383-I
Correo Electrónico: thirtytyrantsprod@gmail.com
Título: Nationalism, memory and humanitarianism in transnational Europe, 1945-1989

Resumen de la Memoria:

I am a contemporary historian specialized in transnational history, with two main research lines: (1) the transnational history and memory of East European fascism; and (2) the history of Catholic humanitarianism and its entanglements with politics and religion. My PhD (Södertörn University, 2016) analysed the Institute of Socio-Political and Historical Studies of the Romanian Communist Party, reconstructing power relations, propaganda dynamics, and the making of national-communist historiography based on previously unexplored archival sources. After my PhD, I shifted toward transnational history. In my international postdoc (2018), I analysed the moral and religious dynamics of Catholic aid during the Great Irish Famine. In three peer-reviewed articles, I analysed the motivations and the strategies by which European Catholics appealed for charitable funds and overcame adversities to deliver relief aid to Ireland during the Great Famine (1847-8).

My second major research line examines the transnational circulation, memorialisation, and survival strategies of East European fascists. In my second postdoc (2019-2021), I have analysed far-right lieux de mémoire in Romania, the global afterlives of legionary symbols, and the entangled memorialization of Romanian volunteers in the Spanish Civil War. This work has produced multiple indexed publications and a chapter in an international volume, and it forms the basis of the project I lead as PI, Strategies for Survival of Displaced Fascists (Östersjöstiftelsen, 2.6M SEK), which investigates how displaced Romanian fascists rebuilt networks, identities, and revisionist narratives in the West after 1945. Using newly opened archives of Pius XII's pontificate, I have shown how the Vatican and Catholic humanitarians assisted displaced Romanian fascists and clerics after WWII, and how these encounters were shaped by overlapping humanitarian, religious (unionism, conversion), and political (anticommunism) aims. Two recent articles (Journal of Contemporary History and Historical Research) have opened a new field on the transnational encounters between East European refugees and Catholic actors in the early Cold War.

The research line I aim to develop in Spain focuses on the role of the transnational encounters and daily transactions between Catholic humanitarians and East European refugees in the making of Catholic anticommunism, 1944-1958. Through six case studies based on Vatican and diocesan archives (Rome and Madrid) and transnational Catholic periodicals, the project reconstructs how daily interactions between refugees and Catholic humanitarians produced knowledge on communist Eastern Europe and turned anticommunism into a global Catholic feature—shared across authoritarian and democratic contexts. The strength of Spanish historiography on East European refugees, Francoism, and political Catholicism, together with key archival holdings (AGA, Archdiocese of Madrid), makes Spain the ideal environment to consolidate this line of research and to prepare, in a subsequent phase, an ERC proposal on Catholic humanitarianism and the memorialization of communism (1980-2000).

Resumen del Currículum Vitae:

Trained as a historian of Eastern Europe with a focus on Romania, after completing my PhD at Södertörn University (2016) I developed an international trajectory centred on transnational history, particularly on fascism and its memory and on faith-based humanitarianism.

My first line of research examines the transnational circulation of apologetic narratives of the Romanian Legionary movement. Working within Prof. Andrej Kotljarchuk's group, I tested the hypothesis that "memory entrepreneurs" preserved and adapted Legionary memory across regimes and borders by downplaying violence and antisemitism. Through multi-archival research in Sweden, Romania, Italy and Spain, I demonstrated how these narratives evolved locally and transnationally. Results include peer-reviewed articles in Memory Studies (2021), Historical Research (2022) and Arhivele Totalitarismului (2021).

A second line of research concerns transnational humanitarian aid. Since 2016, in collaboration with Prof. Norbert Götz's group on moral economies of civil society, I analysed Catholic fundraising for Ireland during the Great Famine (1847-50), investigating actors' motivations, cross-border constraints, and implementation strategies. This work showed how political and religious meaning shaped charitable giving and the practical solutions adopted to overcome territorial barriers. It resulted in three peer-reviewed articles in European Review of History (2021), Journal of Ecclesiastical History (2021), and Quellen und Forschungen (2020).

Building on these paths, my recent work connects nationalism, religion and humanitarianism. As PI of Strategies of Survival for Displaced Fascists (2023-2026), I study post-1945 encounters between Romanian fascists and Western actors, analysing how ideological expectations confronted humanitarian logics. Early results include articles in Journal of Contemporary History (2025) and Historical Research (2025) and a book chapter (Routledge, 2025). This line continues through a pilot project on humanitarianism and nationalism (PI, 2023) and through participation in Prof. Götz's project on the Biafra crisis (2025).

I disseminate my research through the organisation of conferences, workshops and panels, invited lectures (e.g., Bucharest University, 2024), and the co-editing of two scholarly anthologies (Uppsala University Press, 2023; Mimesis, 2020). I have also contributed to teaching and public-facing academic tools within the Erasmus+ Synergy Audit consortium.

International collaboration has been central to my trajectory. I have worked with Prof. Götz's and Prof. Kotljarchuk's groups, contributed as postdoc to the 7M SEK project Memory Politics in Far Right Europe (2019-2021), and collaborated with Dr. Per Anders Rudling on long-distance nationalism (Wallenberg Foundation, 2022). I am PI of a pilot project on humanitarianism and nationalism (LU, 2023-24) and co-organiser of a 2024 conference on post-war displacement. I contribute to the scholarly community as board member of History of Communism in Europe and as reviewer for major journals and funding agencies.

Post-PhD academic distinctions include the title of docent in history (Lund University, 2024) and the Italian national habilitation in contemporary history (2023).



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: ROUCO COLLAZO, JORGE
Referencia: RYC2025-055233-I
Correo Electrónico: jroucocollozo@gmail.com
Título: Building and Landscape Archaeology of the medieval Islamic societies

Resumen de la Memoria:

My research focuses on the study of Islamicate societies in different geographical areas. One of my main lines of research has focused on the transformations of rural landscape in al-Andalus between the 8th and 15th centuries. In addition, in the last two years, I have extended the study of these societies through the analysis of the landscape and urbanism of the Muslim sultanates of the Horn of Africa between the 11th and 16th centuries and to the AlUla region (northwestern Saudi Arabia) between 7th and 20th centuries. In addition, my fields of specialisation within Archaeology are Building Archaeology and Landscape Archaeology, with a strong relationship in all my work with the Digital Humanities.

My research career began at the University of Granada, where I completed a doctoral thesis combining Building Archaeology and Landscape Archaeology. This was carried out in co-supervision with the University of Padova, where international stays were made to learn new technologies for graphic documentation and spatial analysis. This international trajectory of training and application of Digital Humanities has continued during the post-doctoral stage, with a Margarita Salas at the Geography Laboratory of the University of Siena (Italy), applying advanced techniques of spatial statistics to the study of Islamised societies. Subsequently, I joined the international ERC Statehorn project as Juan de la Cierva at INCIPIT (CSIC) and since 2025, as postdoctoral researcher in the AlUla pilgrimage project (Saudi Arabia). This has opened my field of research beyond the Iberian Peninsula, studying medieval Islamic societies in the Horn of Africa and the Arabian Peninsula.

I also have wide experience in many archaeological excavations, as director, trench supervisor or photogrammetric and topographic surveyor, in several geographical areas, gaining solid methodologic and technical skills for archaeological research and survey, both on field and in laboratory.

This line of research has produced interesting results on how Islamic societies organise their territory, resources, architecture and urban planning and how they relate to the different central states of their territory. This work is reflected already on several scientific publications in journals and publishers of international and national prestige (78) and technical reports (49), and also in participation in congresses and other scientific reunions (69). My approach to the application of Digital Humanities has been awarded the prize for best doctoral thesis by the BBVA Foundation and the HDH Association and the Early Career Achievement Prize of the Oscar Montelius Foundation of the European Association of Archaeologists.

These results have also been fruitful in securing funding, as I have been PI of competitive projects (4), fostering my previous experience as researcher in international (MEMOLA, REACH, IRIS, INCULTUM, STATEHORN), national and regional projects (13). This shows how my independence and leadership has grown from the pre-doctoral stage, when I obtained competitive projects, to nowadays, when I am coordinating a multi-year project with 12 researchers and a significant budget.

In addition, my research has also had direct impact on society, encouraging the study, restoration and valorisation of heritage, in collaboration with local stakeholders, through various research contracts (19)

Resumen del Currículum Vitae:

I hold a BA in History from the University of Santiago de Compostela and a MSc in Archaeology from the Universities of Sevilla and Granada. I have a PhD in Archaeology from the University of Granada (UGR) and the University of Padova (UNIPD). I am a medieval archaeologist, specialized in Building Archaeology and Landscape Archaeology. Currently, I am postdoctoral researcher at the Institute of Heritage Sciences of the Spanish National Research Council (INCIPIT-CSIC), working in the AlUla Pilgrimage Routes project.

I have developed my research career between Spain and Italy and my main topic of research is the archaeological study of Islamicate societies, especially their architecture, fortifications and rural landscape. I have worked mainly on the Islamic period of the Iberian Peninsula from the 8th century to the conquest of the Nasrid kingdom at the end of the 15th century. Recently, I have extended the scope of my work to the medieval sultanates of the Horn of Africa and Medieval Arabia Saudi.

As a specialist in Building and Landscape Archaeology, I have a strong interdisciplinary profile. In both of these disciplines, I apply strongly Digital Humanities to foster my analysis. In this line, my multidisciplinary technical skills include the application of Geographical Information Systems and satellite imagery, and LiDAR and photogrammetric surveys, both terrestrial and aerial with the use of drones. In addition, I also conduct research regularly in the field of Virtual Archaeology. In this respect, I have been PI of three projects in this line of work of Digital Humanities applied to Archaeology. This interdisciplinary line of work has started to be recognized, with my PhD thesis awarded HDH Society and BBVA Foundation. I also have wide experience in many archaeological excavations as director, trench supervisor or photogrammetric and topographic surveyor, in several geographical areas.

This work is reflected already on several scientific publications in journals and publishers of international and national prestige (78) and technical reports (49), and also in participation in congresses and other scientific reunions (69). These results have also been fruitful in securing funding, as I have been PI of competitive projects (4), fostering my previous experience as researcher in international (MEMOLA, REACH, IRIS, INCULTUM and ERC-STATEHORN), national and regional projects (13).

In addition to my scientific contributions, I have participated in research contracts (19) in collaboration with other institutions, working closely with regional and local stakeholders on the study and enhancement of historical heritage, with two projects being direct spin-offs of their PhD research. These initiatives have emphasized the involvement of the local population through Community Archaeology programs. My work has also reached broader audiences through interviews in national newspapers, TV, radio, and social media. These efforts have been internationally recognized, including the Early Career Achievement Prize from the Oscar Montelius Foundation and the European Association of Archaeologists.

Furthermore, I have nine years of teaching experience in higher education, covering undergraduate, master's, and doctoral programs across four Spanish universities. I have supervised four master's theses. In addition, I serve as a reviewer for various journals



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: ANDRY, AURÉLIE
Referencia: RYC2025-056076-I
Correo Electrónico: aurelie.andry@eui.eu
Título: The European Left, European Integration and Economic Democracy, 1945-present

Resumen de la Memoria:

Aurélié Andry holds a PhD in History and Civilization from the European University Institute, where in 2017 she defended the thesis “Social Europe” in the long 1970s, the story of a defeat. Before defending the thesis, she has been a Junior Lecturer at the Paris Sorbonne University where she taught courses on European integration history (2015-2017), and has led a European Horizon 2020 Jean Monet Project for one year (2016). She was also part of a European-funded project on the Oral History of the European Commission (HISTCOM3). After defending the PhD, Aurélié Andry has worked as a postdoctoral researcher at the University of Glasgow, where she was part of the ERC project EURECON, then at the University of Évry Paris-Saclay, where she was part of the ANR-DFG (French-German National Research Agencies) Project EURODEM. Since October 2024, she has worked as an Alexander von Humboldt Fellow at the Ruhr University of Bochum (Germany). Andry is also part of a Constructive Advanced Thinking (CAT) project funded by the Network of European Institutes for Advanced Studies, on the past and present of workplace democracy in Europe (DEMWO). She has been teaching and supervising in several universities (Sorbonne, Évry Paris-Saclay, Monash) and published scientific articles in international peer-reviewed journals with a high impact index. In addition, she has published and edited several books in English and French, all of them with prestigious international publishers such as Oxford University Press, Routledge and Palgrave.

As a specialist in contemporary European history and a researcher with extensive field experience in various European countries, Andry’s research focuses on the transnational history of the left, trade unionism, and the labour movement in Europe during the second half of the 20th century. It is structured around three main lines of research: 1/European social democracy and the history of European integration; 2/European trade unionism in the face of European economic and monetary neoliberal transformation, and a socio-history of “Eurocrats”; 3/the circulation of self-management ideas in Europe. In her research she draws inspiration from, and makes use of, innovative theories and methods of analysis, such as transnational history, cultural transfer theory, gender history, prosopography, and global history.

Andry’s research career has been conducted within French and international academic networks. Firstly, those of her host universities: the EUI, Paris-Sorbonne University, the University of Glasgow, the University of Évry Paris-Saclay, and the Ruhr University in Bochum; secondly in universities where she was a research fellow, like the London School of Economics in London and the New School for Social Research in New York. She has been actively involved in the life of these universities and research units, helping to run seminars, organise international conferences, and participate in and lead collective research projects. Her involvement in various international research networks (HEIRS, European Labour History Network) and her frequent participation in international conferences have also enabled her to engage in collective thinking and forge institutional and individual links.

Resumen del Currículum Vitae:

KEY CV ELEMENTS

Professional background:

PhD in History and Civilisations, European University Institute, Florence (2017)

Positions held:

- Postdoctoral Humboldt Research Fellow, Ruhr University Bochum (2024-2025)
- Postdoctoral researcher, ANR-DFG EuroDem project, University of Évry Paris-Saclay & IDHES (2021-2023)
- Postdoctoral researcher, ERC Eurecon project, University of Glasgow (2018-2021)
- Temporary teaching and research assistant (Junior Lecturer), Paris Sorbonne University (2015-2017)
- PhD researcher, European University Institute, Florence (2011-2015)

University Teaching:

456 hours (Monash University, Sorbonne University, University of Évry):

- 20th century: contemporary history: Modernism, its rise and limits (France, 1944-1974) (Bachelor 3rd year)
- History of European integration (Bachelor 2nd year), History of France and Europe (Bachelor 3rd year and Master 1)
- History of social policies in Europe (Master 1)
- Editing, writing and style (Master 1); Techniques and methodology of history (Master 1) Research techniques (Master 2); Thesis supervision (Master 1; Master 2)

Research topics:

- Contemporary history, history of France and Europe in the 20th and 21st centuries
- International, transnational and global history
- History of European integration, history of socialism and trade unionism in Europe
- Circulation of knowledge, cultural transfer of ideas and self-management practices in Europe

Research lead and paper presentations:

- Director of the Jean Monnet Project: Rethinking European Integration History in Times of Crisis (REIHCTC)



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DE CIENCIA, INNOVACIÓN
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

- Co-organiser and co-facilitator of four international conferences; and one research seminar on the history of self-management, 19th-21st centuries (2022-2024)
- Co-founder and co-organiser of the Working Group on the History of European Integration (EUI, 2013-2015); member of the Steering Committee of the HEIRS network (2014-2017)
- Member of the Scientific Committee of the peer-reviewed journal *Storia e Politica. Annali della Fondazione Ugo La Malfa*
- Presentations at 18 conferences and symposia; 22 workshops and seminars



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: GARCÍA VÁZQUEZ, ANA
Referencia: RYC2025-056351-I
Correo Electrónico: ana.garcia.vazquez@gmail.com
Título: Biomolecular Reconstruction of Prehistoric Subsistence and Human-Environment Dynamics

Resumen de la Memoria:

I am a bioarchaeologist specialising in the reconstruction of past subsistence, mobility and human-environment interactions through stable isotope analysis, radiocarbon dating, palaeoproteomics and ancient DNA. My research integrates methodological innovation with the investigation of major archaeological questions across Europe and Western Asia. I have developed new analytical protocols—including the first methodology for isotopic analysis of the acid-insoluble matrix of freshwater molluscs (Unionidae)—and produced high-impact studies on Eneolithic dietary systems, freshwater reservoir effects and the early history of broomcorn millet in southeastern Europe. My work has resulted in 23 peer-reviewed publications (including Scientific Reports, STAR, Nature Ecology & Evolution and Radiocarbon), numerous conference presentations and growing international visibility. My trajectory demonstrates sustained scientific independence. During my postdoctoral career at the University of Bucharest, I established and now lead the first dedicated pre-treatment laboratory for stable isotope analysis in Romania, implementing protocols for collagen extraction (including improvements for fish remains), carbonate preparation and archaeobotanical pre-treatment, and producing the country's first isotopic datasets for several biomaterials. I have supervised MSc and PhD students, coordinated analytical workflows and contributed to strengthening Romanian analytical capacity. I also collaborate closely with Romanian public institutions—including museums, universities and research institutes—and maintain active international partnerships with leading research groups in Germany, Denmark, France, Ukraine, Switzerland, the United States, Poland, Italy and Spain, which have generated joint publications, funded research and access to specialised infrastructures. The research programme proposed here builds directly on this trajectory and comprises three integrated lines. Line 1 investigates Ice Age subsistence and human-faunal interactions in Iberia, using isotopic baselines, ZooMS and radiocarbon dating to explore trophic structure and adaptation around the Last Glacial Maximum. Line 2 examines the early introduction of broomcorn millet into southeastern Europe, building on my recent radiocarbon and isotopic studies to clarify the routes, agents and dietary significance of this crop during the late 4th-early 3rd millennium BC. Line 3 explores long-term coastal subsistence in Atlantic Iberia by extending my AIM protocol to marine taxa and applying Bayesian models to reconstruct marine resource use from the Mesolithic to the Iron Age. Taken together, these research lines articulate an innovative and coherent programme that applies cutting-edge biomolecular methods to long-standing archaeological debates. The programme will enhance methodological capacity within the host institution, provide training opportunities for early-career researchers and strengthen Spain's position in international biomolecular archaeology.

Resumen del Currículum Vitae:

I am a bioarchaeologist specialising in the reconstruction of prehistoric subsistence, mobility and human-environment interactions through stable isotope analysis, radiocarbon dating, palaeoproteomics and ancient DNA. My work integrates zooarchaeology and morphometrics with advanced biomolecular methods, contributing new analytical frameworks for understanding diet, agriculture and palaeoecology in Europe and Western Asia. I completed my PhD at the University of A Coruña with Outstanding Cum Laude distinction and the Extraordinary Doctorate Award. My early postdoctoral research strengthened my archaeological and biomolecular profile through collaborations with INRAP (France), the National Museum of Natural History in Kiev, CSIC (Spain) and the University of Copenhagen. A research stay in Prof. Hofreiter's palaeogenomics laboratory at the University of Potsdam expanded my expertise in ancient DNA. Alongside my existing skills in collagen extraction and stable isotope analysis, I broadened my methodological portfolio by incorporating ZooMS, carbonate extraction for $\delta^{13}C$ analysis and mobility studies. Since 2020, as a Postdoctoral Researcher at the University of Bucharest, I established and now lead the first Romanian laboratory dedicated to the pre-treatment of archaeological samples for stable isotope analysis and radiocarbon dating. I developed new analytical protocols—including a novel method for analysing the acid-insoluble matrix of freshwater molluscs (Unionidae), optimised collagen extraction for fish and introduced total mercury analysis and stable isotope analysis of charred archaeobotanical remains—producing the first isotopic datasets for several biomaterials in Romania. I have supervised MSc and PhD students, coordinated analytical workflows and strengthened national analytical capacity. My scientific independence is demonstrated by my role as PI on several funded projects, including the Sepkoski Grant, and by external funding from major Romanian museums to conduct stable isotope analyses on archaeological collections. I maintain active collaborations with leading research groups in Germany, Denmark, France, Ukraine, Switzerland, the United States, Poland, Italy and Spain, which underpin a strong international research network. I have published 23 peer-reviewed articles (6 Q1, 2 Q2; 14 as first author), four book chapters and 74 conference contributions. My work has received over 450 citations (h-index: 10). My research focuses on subsistence systems, agricultural management, human responses to climatic stress and the development of analytical tools that advance the reconstruction of prehistoric lifeways.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: ENA SANJUÁN, ÍÑIGO
Referencia: RYC2025-054824-I
Correo Electrónico: inigoena@hotmail.com
Título: Sociedad, instituciones y medio natural: aproximaciones desde la Historia (y otras disciplinas)

Resumen de la Memoria:

Mi carrera como historiador se ha desarrollado en torno a dos líneas de investigación: la formación del Estado contemporáneo en la Europa sudoccidental (historia política e historia fiscal y financiera) y la coevolución de sociedades e instituciones humanas y dinámicas ecológicas en los Pirineos (historia medioambiental e historia legal). Tomando como base la noción de práctica, he desarrollado ambas líneas de investigación a partir de un exhaustivo trabajo de fuentes primarias infrautilizadas de archivos en diferentes países. Mis trabajos cuestionan narrativas historiográficas arraigadas, ofrecen nuevas perspectivas e ideas sobre el desarrollo de las sociedades humanas y sus instituciones y abren nuevas vías de investigación interdisciplinar e intersectorial.

Mis principales contribuciones se centran en esos dos campos. Como autor único y generalmente en acceso abierto, he publicado trabajos sometidos a revisión por pares, varios de ellos en revistas indexadas en Q1 y en editoriales prestigiosas como Brill. En los próximos meses verán la luz otros trabajos en Routledge y Firenze University Press, así como mi tesis doctoral, publicada como monográfico por Brepols en 2026/2027. He presentado mis trabajos en renombrados foros internacionales (Datini, WEHC) y en congresos y talleres organizados por grupos de investigación, instituciones y asociaciones de historiadores, así como en eventos destinados a la divulgación y la co-creación de ciencia entre científicos y ciudadanos. También colaboro con colegas de otras disciplinas en el diseño de políticas de restauración ecológica. He ejercido además como revisor para dos revistas científicas españolas y una alemana.

Desde el período predoctoral, mi carrera se ha desarrollado y proyectado internacionalmente. Cursé el doctorado en el Instituto Universitario Europeo (IUE) de Florencia, un crisol de corrientes y escuelas historiográficas de diferentes países y tradiciones académicas en el que se fomenta el intercambio metodológico y el debate en torno a las tendencias historiográficas más recientes. En el IUE pude empezar a tejer mi red internacional de investigadores, que se amplió con mi experiencia como investigador postdoctoral Humboldt en Alemania, en la Universidad Leibniz de Hanóver. Allí me integré en el proyecto ERC IberLAND, un equipo internacional de investigadores con el que me formé en historia del derecho y pude ampliar mi red internacional de contactos.

Pese a carecer de oportunidades de ejercer la docencia de manera continua, he participado en actividades de formación de posgrado y doctorado en centros de referencia como el IUE, el Instituto Universitario de Lisboa o el CSIC. Como investigador principal he logrado captar ~377.000€, con prestigiosas becas a nivel nacional y europeo (Salvador de Madariaga, Alexander von Humboldt, Marie Curie). He organizado ciclos de conferencias y talleres internacionales y he asumido tareas de organización en diversos proyectos nacionales e internacionales. He liderado proyectos y actividades de divulgación a nivel local y regional, facilitando la proyección de investigadores junior.

En el futuro preveo mantener abiertas mis dos líneas de investigación abiertas, ahondando en la interdisciplinariedad e intersectorialidad, retomando el trabajo transfronterizo entre España y Francia y armando una candidatura para un proyecto ERC.

Resumen del Currículum Vitae:

Actualmente soy investigador postdoctoral Marie Skłodowska-Curie en el Instituto Pirenaico de Ecología del Consejo Superior de Investigaciones Científicas (IPE-CSIC). Anteriormente fui investigador postdoctoral Alexander von Humboldt en la Leibniz Universität Hannover (LUH, 2023-2025). Mi formación es de historiador, aunque con un marcado perfil interdisciplinar e intersectorial. Después de cursar grado y máster en la Universidad de Zaragoza, realicé el doctorado en el Instituto Universitario Europeo de Florencia (IUE, 2017-2022).

En los últimos años he publicado una decena de trabajos revisados por pares, entre ellos varios artículos de revista indexados en Q1 Historia según el Scimago Journal Ranking (The Historical Journal, Investigaciones de Historia Económica, Social History, Hispania), capítulos de libro, algunos en editoriales de prestigio como Brill, y actas de congresos nacionales e internacionales (publicaciones en España, Italia y Argentina). Varios trabajos serán publicados en los próximos meses en editoriales internacionales de renombre.

También he impartido conferencias sobre mis dos líneas de investigación en eventos académicos de ocho países diferentes. He participado en talleres y congresos de asociaciones de historiadores e instituciones académicas en diferentes puntos de la geografía española y he presentado mi investigación en foros internacionales como la European Social Science History Conference (Leiden, 2021) el World Economic History Congress (París, 2022), la LVI Settimana di Studi della Fondazione Francesco Datini (Prato, 2025) y la Seventh Biennial Conference of the European Rural History Organization (Coimbra, 2025), entre otras.

He ejercido como investigador principal en cuatro proyectos, tres de ellos europeos, logrando captar alrededor de 377.000€ de financiación, con becas competitivas como la Salvador de Madariaga, la Alexander von Humboldt o la Marie Skłodowska-Curie. He formado parte de diferentes proyectos de investigación nacionales e internacionales. Como investigador asociado al ERC Consolidator Grant IberLAND (Max Planck-LUH, Alemania) he organizado y participado en talleres y ciclos de conferencias. Siendo investigador del proyecto Colonial legacies, invisible institutions, and financial markets in Latin America (and beyond) (IUE, Italia), organicé un ciclo de conferencias y un taller para investigadores noveles. Como miembro del equipo de trabajo en diferentes proyectos de investigación nacionales, he colaborado en el desarrollo de líneas de trabajo a través de congresos, reuniones y talleres, en ocasiones dando como resultado publicaciones revisadas por pares.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

En lo que se refiere a labor de transferencia, he participado en talleres de formación pre- y postdoctoral en centros como el Instituto Universitario Europeo, la Universidad de Hanóver, el Instituto Universitario de Lisboa y el CSIC. A nivel local, he organizado eventos de divulgación científica, estrechando la colaboración entre asociaciones locales y el sistema universitario. Coordiné un proyecto de elaboración de un libro sobre una comunidad benedictina milenaria y la musealización de su monasterio. He participado en charlas y mesas redondas sobre sociedad, ciencia y medioambiente, así como en una jornada de diseño de políticas de restauración ecológica. He ejercido además como revisor en revistas nacionales e internacionales.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: PEZO LANFRANCO, LUIS NICANOR
Referencia: RYC2025-055989-I
Correo Electrónico: luispezolanfranco@gmail.com
Título: Sociopolitical Strategies, Daily Life, and Resilience to Climate Change: Bioarchaeology of the First Urban Centers of the Central Andes

Resumen de la Memoria:

The line of research to be developed aims to advance our understanding of the socio-ecological conditions that underpinned the emergence of the earliest urban centers in the Americas—one of the most compelling yet insufficiently understood topics in New World archaeology. In the Central Andes, the roots of these processes lie in coastal settlements of the Peruvian North-Central Coast (PNCC), which display remarkable monumentality beginning in the Initial Formative Period (3000–1800 BCE). Until our recent publications, scholarly consensus held that these societies developed complex sociopolitical arrangements, eventually leading to states and empires, largely sustained by marine-based economies. However, archaeological research carried out over the past three decades in the PNCC has significantly reshaped our understanding of early urban trajectories and the role of agricultural production in sociopolitical change. We now recognize that both fishing and farming contributed to supporting dense populations and emerging forms of social organization. Despite these advances, major questions remain concerning the specific food resources consumed by the builders of these first urban centers across the Initial Formative and later periods. Additional questions relate to how climatic fluctuations, population pressure, and increasing social differentiation affected lifestyle, health-disease processes, mobility patterns, demography, trajectories of urbanism, and sociopolitical strategies in PNCC, a landscape with limited carrying capacity.

My research program was conceived to solve some specific theoretical problems. It is organized into three integrated work packages combining morphological approaches with state-of-the-art biomolecular techniques. The first work package focuses on subsistence strategies and climate oscillations to test carrying capacity and resilience; the second examines health and demographic patterns to test population pressure scenery; and the third integrates the data with broader archaeological evidence to reconstruct social life and political strategies.

My long-standing collaboration with the Zona Arqueológica Caral—where I have conducted research since 2008 and currently serve as a scientific advisor—ensures reliable access to facilities, archaeological contexts, and sample collections from the 12 archaeological sites dated between 3000–1500 BCE that they are currently investigating in the Supe and Huaura valleys (Caral, Áspero, Vichama, Peñico, Piedra Parada, etc.). My professional archaeologist license in Peru allows me to legally support research projects of any scale and samples export. This guarantees a steady flow of academic activity and a stable research agenda with minimal risk. If awarded a long-term research contract, I plan to provide training across the fields of my expertise, establishing robust research groups, working with cutting-edge analytical techniques, and continuing to generate high-quality archaeological data on prehistoric South American populations.

Resumen del Currículum Vitae:

Name: Luis NicanorPezo Lanfranco

ID number DNI: 60878852z

e-mail: Luis.Pezo@uab.cat

ORCID: 0000-0003-3163-5984

Visiting researcher of the Brazilian National Council for Scientific and Technological Development, Special Program of International Cooperation, Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona

Education

PhD in Genetics and Evolutionary Biology Department - Biosciences Institute, University of São Paulo, Brazil. 2015

Master of Science in Genetics and Evolutionary Biology Department - Biosciences Institute, University of São Paulo, Brazil. 2010

Graduate and Licensed in Archaeology School of Archaeology, Faculty of Social Sciences, National San Marcos University, Peru, 2007, 2010

Postgraduate in Forensic Anthropology and Human Rights, Postgraduate School, Faculty of Social Sciences, National San Marcos University, Peru, 2006

Graduate and Licensed in Dentistry Faculty of Odontology, National San Marcos University, Peru 1997, 2000

I am a bioarcheologist with solid formation and expertise in biomolecular archeology with emphasis in stable isotopes, dental anthropology, and forensic anthropology. Using methods and technics of these fields, my research has focused on biocultural and correlated socioeconomic processes in prehistoric South American societies, including the study of several topics such as evolution of subsistence systems, paleopathology, health-disease processes, human development, and mobility patterns, in past populations of Coastal Brazil and the Central Andes. Throughout my scientific career, I have successfully attracted significant financial support from four of the most competitive research agencies of the South American and European funding systems, such as the European Commission (HE-MSCA-EF), and the São Paulo Research Foundation, the Brazilian National Council for Scientific and Technological Development, and the National Program of Scientific Research and Advanced Studies of Peru (PROCIENCIA Research Projects in Social Sciences Grant), totaling € 500,000. Over my academic trajectory as a bioarcheologist I have made substantial contributions to the knowledge of past societies from prehistoric South America through my 41 scientific reports, which includes 1 Open Access Database (South American Archaeological Isotopic Database – SAAID, 2023, updated in 2025), 30 peer-reviewed articles in scientific journals (24 as first/corresponding author) and 33 conference/podium presentations (27 as first author), and two books. I have been the Principal Investigator in 10 research projects, and collaborator in the field of bioarchaeology in 3 projects) and co-PI in one research project in Forensic Anthropology. Since 2006 I have teaching experience as lecturer in Forensic Anthropology and Bioarchaeology in Peru and Brazil, and since 2022 in two modules (Bioarchaeology and



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Biomolecular Archaeology) of the master's program of the Prehistory Department of the Universitat Autònoma de Barcelona). I also have experience in mentoring new generations of researchers. I successfully supervised four graduate students (TFG) from the IBUSP (Brazil) between 2018 and 2022, and currently I am the advisor of a master's thesis candidate associated with my new project in Peru.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: RIZZO, ALESSANDRO
Referencia: RYC2025-054473-I
Correo Electrónico: alessandrorizzo@ub.edu
Título: A Shared Ground for Dialogue: Muslim-Christian Diplomacy and Interreligious Mediation in the Late Medieval Mediterranean

Resumen de la Memoria:

Over the years, my research has focused primarily on the relationships between the Christian and Muslim worlds in the late medieval Mediterranean, examined from cultural, religious, diplomatic, and commercial perspectives. This interest emerged during my undergraduate studies in European history, when, for my Bachelor's thesis, I analyzed the writings on Islam by Peter the Venerable (d. 1156), Abbot of Cluny. During my Master's degree in medieval history, I broadened my approach to include the history and Arabic sources of the Near East. My doctoral research culminated in a dissertation on the relations between the Republic of Florence and the Mamluk Sultanate (Egypt-Syria, 1250-1517). This work led to the publication of a critical edition, French translation, and analysis of the chancery documents (Brill, 2023), as well as to the submission of a second monograph to Brepols on diplomatic and commercial exchanges between Florence and the Mamluks. In my postdoctoral research, I further expanded this framework to examine the interactions of other European powers with the Mamluk Sultanate, including the Republic of Venice, the Kingdom of France, and the Crown of Aragon. My work addresses both the material and symbolic dimensions of diplomacy and draws on the analytical approaches of the New Diplomatic History. In parallel, I have explored the theoretical foundations of Christian-Muslim relations by comparing juridical principles with diplomatic manuals and archival documentation, thereby challenging persistent simplifications in both historiography and contemporary mass media discourse. I have presented my research at international conferences and seminars and published in top-ranked journals and edited volumes. Research stays at institutions in Liège, Aix-Marseille, Chicago, Bonn, Munich, and Barcelona, together with the organization of international academic events, have enabled me to develop a strong and reliable scholarly network. In addition to my research activities, I have taught courses in Islamic and Mediterranean history and supervised students, both formally and informally, in their research projects. My work has been supported by individual competitive grants and contracts (FNRS, WBI, Alexander von Humboldt Foundation, Beatriu de Pinós), all of which I have successfully completed within the designated timeframes. Over the next five years, I aim to pursue a project that substantially broadens my scope beyond the Mamluk Sultanate. I will focus on interreligious diplomacy between the Crown of Aragon and various Muslim powers in the Mediterranean. This research will result in a comparative and comprehensive study of the conceptual frameworks and practical strategies developed by a Christian polity in its diplomatic relations with Muslim entities, including the Marinids, Zayyanids, Nasrids, Hafsids, and Mamluks. The findings of this project will be disseminated through journal articles, conference papers, and seminars aimed at both academic and non-academic audiences. In the final two years, I will concentrate on the completion of a monograph presenting the project's results. In parallel, I will prepare and submit a collective project aimed at editing and studying unpublished documents preserved at the Archives of the Crown of Aragon in Barcelona, as well as examine aspects that my individual research will not cover.

Resumen del Currículum Vitae:

I am a historian specializing in diplomatic and cross-cultural relations between Christian and Islamic powers in the late medieval Mediterranean. My work contributes to the fields of Medieval History and Islamic Studies through critical editions of primary sources, comparative diplomatic analysis, and the development of new perspectives on Mediterranean connections. I have carried out research thanks to individual competitive grants in Belgium, USA, France, Spain, and Germany and collaborated across several European institutions. My findings are disseminated in a book, articles in top-rated journals (Anuario de Estudios Medievales, Der Islam, Eurasian Studies, Al-Masaq, etc.) and chapters in edited volumes. I have taught courses and seminars on medieval Islamic history at the University of Liège and University of Munich (LMU), as well as co-supervised a Master's thesis and served on the jury for a Doctoral dissertation. I have co-organized international congresses, online seminars and presented panels and papers at various conferences (in Japan, Canada, Italy, France, Scotland, Greece, Spain, Belgium, Germany). I am a member of the editorial board of Quaderni di Studi Arabi (Brill) and in 2024 I obtained the Italian qualification for associate professor (History of Islamic Countries). I completed my higher and doctoral education in European and Islamic medieval history at the Universities of Turin (BA), Pisa (MA), and Liège (PhD), with research stays at the Universities of Damascus (2008), Chicago (2015), and Aix-Marseille (2016). In October 2017, I obtained a joint PhD from the Universities of Liège and Aix-Marseille. My dissertation included the edition, French translation, and analysis of all surviving chancery documents (in Arabic, Italian, Latin) relating to diplomacy between Florence and the Mamluk Sultanate (published by Brill in 2023), as well as a study of diplomatic missions (manuscript submitted to Brepols). In November 2017, I joined the Annemarie Schimmel Kolleg at the University of Bonn as a junior fellow. I then pursued postdoctoral research at the Institució Milà i Fontanals (CSIC, Barcelona) from October 2018, funded by Wallonie-Bruxelles International. In October 2020, I began a postdoctoral position (Fonds national de la recherche scientifique, Belgium) at the University of Liège. Between December 2021 and November 2023, I was an Alexander von Humboldt Fellow at the LMU (University of Munich), before returning to Liège in October 2023. Since April 2025, I have been a Beatriu de Pinós postdoctoral fellow at the University of Barcelona (UB) (for the topics of the projects, see the CVA). I am currently preparing a course to teach at the UB. These experiences have strengthened my expertise in medieval Mediterranean diplomacy and allowed me to develop key competencies in academic leadership, teamwork, and scientific dissemination. I speak Italian (native), French (C1), English (C1), German (B2), Spanish (B2), and Catalan (B2). Through the collective projects in which I have been involved since my doctoral years, as well as two postdoctoral fellowships at the Milà i Fontanals Institute (2018-2020) and at the University of Barcelona (my current Beatriu de Pinós fellowship), I have become well integrated into the academic environment of Barcelona and, thanks to several collaborations, into the Spanish research landscape.



MINISTERIO
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: BEN AROUS, ESLEM
Referencia: RYC2025-056573-I
Correo Electrónico: eslem.benarous@cenieh.es
Título: Chronological narrative of the Human emergence in Africa

Resumen de la Memoria:

Over the last decade, I have built my research identity around the African Pleistocene, Geochronology and African Prehistory. I focused on establishing robust chronological frameworks for human occupation across Africa over the last 500 ka to refine temporal and environmental contexts in underrepresented regions, including northern, western, and central Africa. I have developed multi-technique dating approaches combining ESR, US-ESR, and luminescence, and I am advancing novel ESR methodologies on quartz.

Since my PhD (obtained in 2019) at MNHN (France), I produced a regional chronology for the MSA and LSA of Rabat-Témara (Morocco). I have considerably expanded my research in western Africa during a Fyssen Postdoctoral Fellowship (2020-2022), implementing ESR protocols for challenging tropical sediments, clarifying early human occupation in forests and mangroves, and testing the Pan-African model. At CENIEH, Spain, I led the EU-MSCA-EF WATIME project (2023-2025), optimizing ESR techniques across >50 samples from five western African countries and contributing to understanding early *H. sapiens* cultural and ecological diversity. In Central Africa, I collaborate on projects in Angola (Mormolo and PaleoLeba) generating novel chronological, cultural, and paleoenvironmental datasets. I also lead the PeupLE-SIDIZIN project in Tunisia, coordinating fieldwork and data collection alongside dating work based on the development of ESR on tooth enamel and ESR on quartz.

I collaborate with over 35 researchers from 27 institutions worldwide. My visibility is strengthened through keynote lectures and invited seminars (e.g., Harvard, University of Zürich, MPI-GEA), co-organization of the SAfA 2025 session, editorial contributions to *L'Anthropologie*, outreach via TV5 Monde, *The Conversation*, videos, and advocacy for women in science. I mentor early-career researchers, have secured 13 competitive grants, and published a first-author *Nature* paper (52,000 accesses).

ChronoHumanAfrica represents a strategic shift from my previous research trajectory, both in temporal focus and scientific ambition. While my earlier research was focused on the late Middle to Upper Pleistocene (~150-10 ka), this project targets the period between 500 and 200 ka, a key period to understand the emergence of *H. sapiens* but still largely unknown due to chronological limits and poor preservation of the sediment and the sites of that period. Conceptually, ChronoHumanAfrica moves from regional case studies to a continental scale to test the Pan-African model. Methodologically, it advances beyond existing dating techniques through the development and validation of new ESR and single-grain approaches. Under Ramón y Cajal funding, I consolidate my transition to senior researcher, coordinating an international network, advancing geochronology field, and addressing a high-risk, high-reward question in human evolution, positioning me for ambitious funding such as an ERC competitive funding.

Resumen del Currículum Vitae:

I am an African Pleistocene geochronologist and archaeologist specialising in the establishment of robust chronological frameworks for human occupation across Africa over the last 500 ka, a critical period for the emergence and evolution of Homo sapiens. My research integrates geochronology, archaeology, and geoarchaeology to refine the temporal and environmental context of cultural change, with a particular focus on regions that have long remained underrepresented in continental syntheses, including northern, western and central Africa.

Over the past decade, including nearly seven years of postdoctoral experience, I have developed a strong international research profile through positions at the Muséum national d'Histoire naturelle (France), the Max Planck Institute for Geoanthropology (Germany), and CENIEH (Spain). My research moves beyond site-specific chronologies to address broader questions related to technological innovation, population dynamics, and human-environment interactions. Since 2020, my work has been supported by highly competitive international funding, notably an EU MSCA fellowship (WATIME), through which I have combined ESR and luminescence dating and developed innovative ESR dating protocol on quartz grain aimed at reducing chronological uncertainties in complex open-air located in diverse geological contexts of western Africa.

My work has significantly advanced understanding of the ecological breadth of early Homo sapiens by providing some of the earliest securely dated evidence for human occupation of tropical forests and mangrove environments. I am among the few researchers globally to dedicate my career to empirically testing the Pan-African model of human evolution, which posits that our species emerged through interconnected populations distributed across Africa under fluctuating environmental conditions. As a specialist in ESR and luminescence dating, I have contributed to the development and validation of new analytical protocols in close collaboration with international geochronologists and Africanist archaeologists.

My international standing is demonstrated by sustained scientific productivity and a broad collaborative network. I have authored 20 peer-reviewed articles (with additional papers accepted or in preparation), two book chapters, receiving over 213 citations (h-index: 8); all publications are co-authored with international collaborators. I have secured or contributed to 13 competitive grants and collaborate with more than 35 researchers across 27 institutions in Africa, Europe, and North America.

I am first author of a Nature paper (2025), accessed over 52,000 times, and my research has reached a broad audience through TV5 Monde, journal interviews, and an article in The Conversation (13,000+ views). I co-edited a special issue of L'Anthropologie (2023) on western and central African prehistory and actively engage in science communication, including outreach videos and advocacy for women in research. I regularly serve as a reviewer for leading journals and contribute to the scientific community through conference organization, special-issue editing, international teaching, and capacity-building initiatives in Africa. My research integrates cutting-edge research, mentorship, and public engagement, reflecting a sustained commitment to advancing human evolutionary studies globally.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: GARCIA COLLADO, MAITE IRIS
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Correo Electrónico: maiteirisgarcia@gmail.com
Título: Arqueología biomolecular de la Alta Edad Media en el norte peninsular
Resumen de la Memoria:

La línea de investigación propuesta se titula "Identidades, dieta y movilidad. Bioarqueología y arqueología biomolecular para la renovación del estudio de los registros osteoarqueológicos históricos en el norte de Iberia desde una perspectiva global". Los materiales bioarqueológicos no solo tienen el potencial de informarnos sobre los cultivos del pasado, los usos asignados a cada animal o cómo se explotaban los recursos forestales, sino que también tienen una notable capacidad para conectarnos con las personas que estaban detrás de estas actividades. El registro bioarqueológico incluye restos óseos de mamíferos y aves, espinas de pescado y conchas de moluscos, semillas, carbón vegetal, polen, fitolitos e incluso restos amorfos de alimentos cocinados. Sin embargo, son los restos antropológicos, como los huesos y dientes humanos, los que proporcionan la evidencia más directa sobre quiénes eran estas personas, quiénes aspiraban a ser, qué hacían y cómo vivían. Este proyecto de investigación pretende establecer una sólida línea de investigación centrada en la bioarqueología y enfocada en el estudio de restos humanos de contextos arqueológicos históricos, sin olvidar las conexiones con la zooarqueología y la arqueobotánica.

La bioarqueología, en particular la arqueología biomolecular, es una de las disciplinas que más ha contribuido a la renovación de la práctica y la investigación arqueológica en las últimas décadas. Por un lado, el desarrollo de métodos más precisos para estimar variables básicas como la edad y el sexo ha mejorado los modelos demográficos de poblaciones pasadas. Esto ha permitido replantear cuestiones cruciales de la historia europea, como el impacto de la peste negra en las sociedades de finales de la Edad Media y principios de la Edad Moderna, o explorar temas que antes carecían de evidencia escrita o material, como la variabilidad en la edad de la pubertad y sus efectos en la fertilidad de las poblaciones pasadas. Por otro lado, la aparición de los análisis isotópicos, que proporcionan información individualizada sobre la dieta y la movilidad, así como sobre las prácticas agrícolas y ganaderas y los cambios ambientales, ha representado un cambio de paradigma. Estos análisis permiten trazar biografías detalladas de individuos, destacando la importancia de las identidades personales y colectivas en la formación de hábitos y comportamientos. Además de ofrecer información específica sobre las diferencias dietéticas entre grupos sociales o la proporción de individuos no locales en una comunidad, los datos isotópicos son valiosos porque caracterizan sociedades enteras sin las limitaciones de las fuentes escritas.

Mi formación académica y experiencia investigadora me han preparado para aplicar estas líneas de investigación a contextos arqueológicos históricos del norte de Iberia, donde hasta ahora han experimentado un desarrollo limitado. En concreto, las principales cuestiones que se abordarán incluyen la transición entre el mundo romano y el medieval, la evolución de las estrategias de representación social en los contextos funerarios de esta época, el impacto de los movimientos migratorios a gran escala que caracterizaron el primer milenio d. C., y los cambios en las prácticas agrícolas y ganaderas durante la Edad Media y sus efectos en las redes de suministro y los patrones alimentarios humanos.

Resumen del Currículum Vitae:

Comencé mi carrera investigadora en la Universidad del País Vasco en 2012 con un contrato predoctoral financiado por el Gobierno Vasco. Este culminó en 2020 con mi doctorado titulado Arqueología social de la alimentación en la Iberia rural de la Alta Edad Media (siglos V-IX d. C.), galardonado con un premio extraordinario de doctorado. Entre 2021 y 2024 fui investigadora postdoctoral en las Universidades del País Vasco y de York, financiada por el Gobierno Vasco. Allí perfeccioné mi formación en arqueología biomolecular y me desarrollé mi propia línea de investigación centrada en el análisis comparativo de las dietas de las poblaciones rurales y urbanas en Iberia durante la Alta Edad Media. Recientemente (2025) me incorporé de nuevo a la Universidad de York como investigadora postdoctoral en el proyecto ERC Medgreenrev, donde soy responsable de los análisis isotópicos para investigar el impacto de la conquista islámica en las prácticas agrarias. Además, he trabajado como profesora de arqueología en la Universidad del País Vasco (2020-2021, 2024-2025).

Mis principales intereses de investigación giran en torno a la aplicación de métodos biomoleculares para la caracterización social de poblaciones históricas, con especial atención a la dieta y los patrones de movilidad de las comunidades rurales y urbanas de la Alta Edad Media. Mi tesis doctoral fue el primer estudio a gran escala sobre la dieta de poblaciones ibéricas de la Alta Edad Media basado en análisis isotópicos. Los resultados destacaron el potencial de la dieta para identificar diferencias sociales y revelaron la importancia del mijo y las prácticas solidarias en la configuración de las estrategias productivas durante la Alta Edad Media. Además, he participado en el desarrollo de importantes avances metodológicos en arqueología biomolecular y análisis de big data con grupos de investigación ajenos a mi alma mater. Actualmente soy miembro del centro BioArCh de la Universidad de York y una colaboradora consolidada del Grupo de Investigación en Arqueología Medieval de la Universidad del País Vasco. También participo en proyectos liderados por otras instituciones. Fui investigadora principal de un proyecto de investigación sobre la dieta infantil, financiado por la Fundación Palarq.

Mi investigación ha realizado importantes contribuciones a la sociedad. He establecido colaboraciones regulares con instituciones públicas y privadas para aplicar los métodos y resultados de mi investigación a nuevos descubrimientos arqueológicos. Mantengo también una intensa actividad de divulgación científica. Participo quincenalmente en un programa de radio. Mi investigación también ha aparecido en otros medios y participo regularmente en eventos de divulgación.

Finalmente, tengo varias pruebas que demuestran mi creciente liderazgo e independencia como investigadora. Estoy comprometida con la supervisión de investigadores jóvenes y hasta la fecha he supervisado tres tesis de grado y tres de máster. También fui tutora de una investigadora visitante Erasmus+ y supervisé las prácticas de un estudiante de grado. Además, formé parte del consejo editorial de una revista científica, he realizado revisiones por pares para once revistas y he formado parte del comité de evaluación de programas de financiación de la investigación españoles y polacos.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: CIOLFI, LORENZO MARIA
Referencia: RYC2025-056946-I
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Título: The Late Antique and Byzantine Emperors and Empresses at the Sacred Threshold

Resumen de la Memoria:

Dr. Lorenzo Maria Ciolfi's research profile is defined by a coherent, interdisciplinary inquiry into the historical, cultural, literary, and religious continuities between the Ancient, Late Antique, and Byzantine worlds. His work combines rigorous historical and philological analysis with historical and socio-anthropological approaches, illuminating the construction of social memory and the interplay between political power and sanctity. His research leadership is evident in two sustained strands: imperial sanctity and hagiography, culminating in a forthcoming monograph with the Société des Bollandistes; and paremiography/fable studies, highlighted by his recent Medici Aesop publication. Dr. Ciolfi's prolific output includes over forty publications across a monograph, edited volumes (14), peer-reviewed articles (9), book chapters (3), proceedings (16), encyclopaedia entries (9), reviews (10), and editions with historical introduction, translation and commentary (8).

Ten key contributions stand out: a groundbreaking codicological study of a 10th-century Demosthenes manuscript; a description of Dio Cassius and Polybius' reception in Late Antiquity and Byzantium; a seminal article tracing the enduring legacy of Emperor John III Vatatzes. His research further reinterprets the Byzantine Synaxarium as a tool for structuring temporal experience, systematically analyses imperial entries within it (from Constantine I) and explores the reception of Eustathios of Thessalonica in paremiographical collections. Recent work includes a prosopographical study of Empress Irene Lascarina, an analysis of Classical echoes in Gregory of Nyssa, as well as a new reading of a luxurious Aesopic codex from the Medici family.

Dr. Ciolfi's career is marked by strong internationalization and mobility, shaped by training in Italy and France, and enriched by competitive fellowships and participation as researcher into European Union research projects (a Polish NSC-funded project on animals representation, at the University of Silesia; an ERC Consolidator Granted project on Greek grammars in Belgium, at the University of Ghent). His current Juan de la Cierva Fellowship at the Universidad Complutense de Madrid underscores his recognized excellence. He has presented at 36 international conferences and delivered 22 invited seminars, balancing specialist discourse with public engagement.

He demonstrates significant independence and leadership, having co-convened conferences, organized a panel for the International Congress of Byzantine Studies, and held editorial roles for recognized journals.

The future research line he proposes represents a strategic evolution from case-study analysis to a systematic, comparative synthesis on the role and representation of Roman-Byzantine sovereigns, from Antiquity onwards. This project aims to map the narrative construction of sacred sovereignty from the 4th to the 15th centuries, engaging in broader interdisciplinary dialogue on both classic and pre-modern political theories. It reflects his unique methodology – a material and historical philology attuned to cultural transmission – and his capacity to design ambitious, collaborative research that bridges philological precision with broad historical inquiry, promising significant contributions to the fields of Late Antique and Byzantine studies.

Resumen del Currículum Vitae:

Dr. Lorenzo Maria Ciolfi is an interdisciplinary scholar whose work bridges Ancient history, Late Antiquity, Philology, and Classical Reception. His research critically analyses the evolution of cultural and religious paradigms, focusing on imperial sainthood, Byzantine hagiography, and the transmission of Greek texts from Late Antiquity to the Renaissance.

A key contribution is his groundbreaking re-evaluation of the cult of Emperor John III Vatatzes. By synergising rigorous philology with a socio-anthropological lens, he has deconstructed previous historiographical assumptions, offering a new paradigm for understanding imperial sanctity. This work presents influential hypotheses on hagiographical texts as instruments of political legitimacy and identity formation.

In a related methodological strand, his meticulous study of 15th-16th century Greek proverbs and fables collections has reconstructed important Renaissance intellectual networks, illuminating the dynamic manuscript exchanges between migrating Greek scholars, like the Apostolis family, and Western humanists such as Erasmus (which charted a key channel of classical reception).

His investigations are grounded in expert codicology, palaeography, and textual criticism. Findings are disseminated through a substantial publication record, including a monograph, edited volumes, numerous peer-reviewed articles, and critical editions; his research has been presented at over 55 international conferences across Europe and North America.

Recognition is affirmed by international affiliations as well as competitive fellowships, including a Juan de la Cierva postdoctoral fellowship, an International Fellowship at the New Europe College in Bucharest, and a residency at Harvard's Dumbarton Oaks. His profile is markedly international, featuring extended research stays and deep collaborations with institutions across Europe and the United States, resulting in co-authored publications and shared digital humanities projects.

He possesses full professional proficiency in Italian, English, French, and Spanish, complemented by an expert command of Latin, Ancient, and Byzantine Greek for seamless work with primary sources.

Beyond research, he stewards the scholarly community through editorial board roles, peer review, and convening panels at major congresses. Committed to public engagement, he translates classical texts for a wider readership and brings pedagogical experience from teaching Classics in Italy and France. His career demonstrates intentional mobility and adaptation within different academic systems, with a consistent record of awards and fellowships attesting to the originality, quality, and broad recognition of his contributions to the humanities.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: PÉREZ RAMALLO, PATXI
Referencia: RYC2025-055695-I
Correo Electrónico: patxi@ramallo.com
Título: Bioarqueología de poblaciones medievales europeas: dieta, salud, movilidad y formación de comunidades
Resumen de la Memoria:

Patxi Pérez Ramallo (Santiago de Compostela, 20/06/1988) es historiador y bioarqueólogo especializado en el estudio de las sociedades medievales europeas, con especial atención a la Península Ibérica y a los territorios articulados en torno al Camino de Santiago. Su línea de investigación analiza cómo la movilidad de personas, animales e ideas, peregrinaciones, migraciones internas y contactos interregionales; así como el impacto de grandes cambios ambientales, sociales y económicos (Anomalía Climática Medieval, inicio de la Pequeña Edad del Hielo, crisis del siglo XIV por hambrunas y la Peste Negra) configuraron la formación, transformación y resiliencia de las comunidades medievales, especialmente en minorías sociales y religiosas. Para ello combina su formación en Historia con un enfoque multidisciplinar que integra osteología humana, análisis isotópicos, datación por radiocarbono con modelos bayesianos y, en colaboración, ADN antiguo. A partir de los restos óseos reconstruye perfiles biológicos (edad, sexo, estatura, patologías), identifica carencias nutricionales y vitamínicas, indicadores de trabajo físico y estilos de vida, y estudia la dieta, el origen geográfico, la movilidad y el estatus social de los individuos. Este enfoque le permite pasar de biografías individuales a patrones poblacionales y comparar contextos urbanos y rurales, laicos y religiosos, mayoritarios y minoritarios; algo que ha aplicado, entre otros, al estudio de monjes guerreros, de los primeros habitantes de Santiago de Compostela (siglos IX-XII) y de poblaciones urbanas, rurales y de élite social del noreste peninsular (siglos XII-XV).

Esta línea se consolidó con su tesis doctoral internacional, financiada por la Fundación [la Caixa](#), en la que investigó el origen y la evolución del Camino de Santiago entre los siglos IX y XV mediante el estudio osteológico y biomolecular de más de doscientos individuos humanos y abundante fauna procedentes de decenas de yacimientos del norte peninsular, incluida la catedral de Santiago. El proyecto mostró cómo la peregrinación generó paisajes sociales nuevos, con comunidades mixtas donde convivían poblaciones locales, foráneas y élites eclesiásticas, y propuso nuevas cronologías y lecturas sociales para algunos de los hitos fundacionales del culto jacobino, incluyendo la posible identificación del obispo Teodomiro de Iria Flavia.

Tras la tesis, Pérez Ramallo ha extendido esta perspectiva al análisis de otros colectivos y territorios vinculados directa o indirectamente a las rutas de peregrinación y a las dinámicas de frontera. Su trabajo postdoctoral aborda, por un lado, minorías musulmanas y órdenes militares en los reinos cristianos peninsulares y, por otro, el origen y desarrollo de las ciudades de la Flandes medieval, uno de los principales núcleos urbanos de Europa occidental. En ambos casos mantiene el mismo hilo conductor: emplear las biografías óseas, los isótopos y el ^{14}C para entender cómo la movilidad, la religiosidad, las desigualdades sociales y las variaciones climáticas afectaron a la salud, la dieta y la capacidad de adaptación de las comunidades medievales. De forma complementaria, participa en proyectos sobre poblaciones medievales del Cuerno de África y Armenia y sobre contextos prehispánicos y coloniales en América.

Resumen del Currículum Vitae:

Patxi Pérez Ramallo es historiador y bioarqueólogo especializado en osteología humana, isótopos estables y ^{14}C aplicados a sociedades medievales. Desde la defensa de su doctorado internacional en 2021 ha encadenado contratos postdoctorales competitivos en centros de referencia: Max Planck Institute of Geoanthropology (Alemania), NTNU University Museum (Noruega); y actualmente en la Vrije Universiteit Brussel (VUB) (Bélgica), manteniendo una afiliación como investigador asociado en el Max Planck.

Es licenciado en Historia por la Universidad de Santiago de Compostela (USC), MSc en Archaeological Sciences por la University of Bradford (Reino Unido), y doctor internacional por el programa de Análisis Forenses de la Universidad del País Vasco (EHU). Su tesis, un proyecto propio sobre los orígenes y desarrollo del Camino de Santiago, fue financiada por la beca de doctorado [la Caixa](#) y obtuvo el premio de la Cátedra del Camino de Santiago y de las Peregrinaciones (USC).

Ha obtenido y gestionado de forma competitiva múltiples ayudas como IP: beca [la Caixa](#), ayudas de la Fundación Palarq y George Greenia (USA), contrato postdoctoral Margarita Salas-Next Generation EU, proyectos y contratos de investigación locales, así como una Juan de la Cierva-Formación concedida que decidió declinar. Participa además en grandes proyectos internacionales financiados por el Research Council of Norway (SCAPE) y el Plan Nacional español (NetHorn), donde actúa como responsable de isótopos y ^{14}C .

Su producción científica incluye artículos como primer autor en revistas de alto impacto en arqueología e historia (Antiquity, Scientific Reports, Archaeological and Anthropological Sciences), junto con contribuciones en trabajos en revistas de máximo nivel (Nature, Science Advances, Cell, Current Biology). Entre sus resultados más visibles destacan el posible reconocimiento del obispo Teodomiro de Iria Flavia, el estudio de los primeros habitantes de Santiago de Compostela, el más largo análisis de las dietas y jerarquías sociales en órdenes militares, el primer gran estudio de minorías musulmanas en la Península, y trabajos sobre poblaciones africanas y amerindias en contextos coloniales.

En el ámbito docente y formativo, ha impartido clases en grados y másteres de arqueología en la Universidad de Santiago de Compostela, NTNU y VUB, y ha co-dirigido trabajos fin de máster en osteología e isótopos. Ha sido invitado como ponente en congresos y seminarios internacionales (Oxford, Reading, Quimper, Salamanca, entre otros) y ha pronunciado conferencias plenarias sobre el Camino de Santiago.

Su experiencia se completa con una etapa de colaboración con la policía forense noruega (KRIPOS), la coordinación actual del laboratorio de isótopos de carbono y nitrógeno del BB-LAB (VUB), el apoyo a exposiciones museísticas y la participación en proyectos de memoria histórica (Guerra Civil española) y de gestión del patrimonio arqueológico. Supervisa de forma regular a estudiantes en proyectos de bioarqueología medieval. Es además Review Editor en Frontiers in Environmental Archaeology y ha actuado como revisor para revistas como PLOS ONE o Archaeological and



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Anthropological Sciences, entre otras. En conjunto, su trayectoria combina liderazgo de proyectos, financiación competitiva, publicaciones de alto impacto y una proyección internacional poco habitual para su etapa de carrera.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: MANKE DE CASTILLO ELEJABEYTIA, ALBERT LOPE
Referencia: RYC2025-057426-I
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Título: Feminist South-East Interactions Between Havana and Berlin in the Cold War: Analyzing Left-Wing Women's Agency and Knowledge Production Through an Intersectional and Decolonial Lens

Resumen de la Memoria:

This project will analyze left-wing women's interactions between Cuba and the GDR during the Cold War through an intersectional and decolonial lens by centering on agency and knowledge production in transnational networks. Along well-known leaders such as WIDF Vice-Presidents Vilma Espín and Ilse Thiele, it scrutinizes the day-to-day collaboration of women like Dora Carcaño, Yolanda Ferrer and Monika Krause for women's rights and education, solidarity and support for liberation, decolonization, and disarmament. This is situated in a transatlantic circulation of knowledge and practices of independence, revolution, and women's movements since the late nineteenth century which became encapsulated in the Spanish Civil War. Who participated in interactions between Cuba and the GDR? How did these women contribute to the production of feminist knowledge, women's rights, and sexual education? How did this knowledge shape gender relations in the target countries? What can an intersectional and decolonial analysis tell us about the shape and quality of women's transnational relations? Which specific factors of their agency can we identify in the highly masculinized and ideologized field of Cold War policymaking, particularly in international organizations and educational exchange? As an initial hypothesis, the project claims that the shared history of women's transnational activism in Cuba and the GDR from 1959 to 1989 allows for an almost unparalleled long-term analysis of the connected yet uneven relationship between the Global South and East. Preliminary research shows that several assumptions about asymmetric relations and dependency between the "Second" and the "Third" world have to be reevaluated, particularly regarding the notions of "center" and "periphery" between Berlin and Havana, and a critical reading of the coloniality of uneven exchanges in policy and sexual education. Cuban women, living in a multi-ethnic and revolutionary society, took decisions taking into account the intersection of sex, race, and class – unlike their German counterparts which relied more on established organizational structures. This project combines the history of women, gender, and knowledge while following an actor-centered and transnational approach mapping out the flows of knowledge, people, and ideas between the Global South and socialist Europe. It will constitute the first comprehensive study on women's interactions between Cuba and the GDR. The project will analyze hitherto neglected or inaccessible sources with an innovative theoretical approach inscribed in New Cold War History focusing on intersectionality, decoloniality, and gendered knowledge production. This adds critical insight by delving into the unevenness, frictions, and potential contradictions of interactions of women with different socioeconomic and racial backgrounds.

Resumen del Currículum Vitae:

I am a postdoctoral researcher in the ERC project "Women and Non-Alignment in the Cold War era: biographical and intersectional perspectives" (WO-NAM) at the University of Venice (PI: C. Bonfiglioli). I am also a Senior Fellow at the Institute of European Studies of the University of California, Berkeley, where I was the first GHI Tandem Fellow and a research fellow. At the University of Cologne, I was co-director of the project "Ethnicity as a Political Resource." I served as Max Weber Fellow at Osnabrück University and as Research Fellow at the Center for Interdisciplinary Studies at the Bielefeld University. I have been a visiting scholar at prestigious universities in Latin America, the United States, Europe, and Asia. My research interests follow the histories of women, gender, mobility, and resistance in the Americas with a special focus on Cuba's global entanglements in the Cold War. My PhD studies focused on the social, military and gendered history of Cuba and its roots in the Spanish empire, particularly on Cold War conflict against the background of asymmetrical hemispheric relationships with the U.S. and transatlantic engagements with Europe. For this, I conducted extensive research in over forty institutions in eight countries (mostly in Cuba and the U.S.) where I found a plethora of documents and was able to conduct over 120 oral history interviews with contemporary witnesses. I also developed an innovative methodological approach to agency and the institutionalization of social movements while paying special attention to women's self-empowerment. This prepared me for my recent turn to women's and gender studies (since 2024), which I had already included in my teaching since 2011 (courses and lectures on women in Latin American guerrilla and resistance movements). After my PhD, I conducted research on Asian exclusion and transpacific migration to the Americas in Cuba, Mexico, Costa Rica, the Philippines, China, and the United States, funded by the German Excellence Initiative. This resulted in my second monograph (Manke 2020 and 2021) and several peer-reviewed articles. I have presented my current research on Cuban women's transnational networks multiple times in 2025, for example at the University of Cambridge and in the U.S., Costa Rica, Italy, Croatia, and Mexico. Based on my current research in Venice, I have developed this project for the Ayudas Ramón y Cajal which will look at Feminist South-East Interactions Between Havana and Berlin in the Cold War. My research has sparked immediate interest among outstanding scholars in Women's and Cold War Studies, which will result in several publications in 2026 and 2027. For the Wo-NAM project, I have so far collected thousands of documents in Cuban and Mexican archives and recorded 11 interviews with women in Cuba, including leading figures from the FMC and WIDF and Mariela Castro Espín, the daughter of Vilma Espín. In addition to my experience on Cold War Cuba from my PhD research, this and my bilingual Spanish-German capacities will guarantee the viability of the project in terms of oral history and archival research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: DE PEDRO ÁLVAREZ, CRISTINA
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Título: Sexualidad, género y espacio en las ciudades de principios del siglo XX

Resumen de la Memoria:

Soy investigadora especializada en estudios urbanos y en la historia de la sexualidad. Mi investigación se ha centrado en analizar la transformación de las costumbres y los imaginarios sexuales y de género en relación con los procesos de modernización urbana e industrialización durante el periodo de entreguerras. He examinado este fenómeno principalmente en Madrid, aunque prestando atención a sus paralelismos con otras grandes ciudades europeas, y con especial énfasis en los barrios obreros. Este enfoque se sitúa en la intersección entre la historia de la sexualidad, la historia urbana, los estudios de género y la cultura popular. Mi principal contribución ha sido demostrar cómo las grandes ciudades de entreguerras se convirtieron en espacios centrales para la mutación y la experimentación de las prácticas sexuales, de dos maneras: prestando atención a la expansión y diversificación del mercado sexual y observando la transformación de las costumbres e imaginarios sexuales de la juventud obrera. Estos resultados han renovado las narrativas sobre la construcción de la sexualidad moderna, al poner en primer plano las experiencias cotidianas y reconocer la agencia de actores históricos anteriormente desatendidos, especialmente las mujeres de clase trabajadora. También han abierto una nueva línea de investigación que vincula la historia de la sexualidad y los estudios urbanos, que no se había desarrollado anteriormente en España.

La línea de investigación futura que desarrollaré a través de las Ayudas Ramón y Cajal se basa en la trayectoria académica descrita anteriormente y tiene como objetivo consolidarla y ampliarla. Bajo el título Género y relaciones de vecindad en las ciudades europeas, un enfoque transnacional (1860-1939), examina, desde una perspectiva de género, la configuración de las relaciones de vecindad en contextos urbanos en el periodo 1860-1939. Su objetivo es comprender el papel histórico desempeñado por las mujeres en la gestión de los vínculos de proximidad en ciudades marcadas por fuertes procesos de transformación urbana y diversificación social.

Resumen del Currículum Vitae:

Defendí mi tesis doctoral en la Universidad Complutense de Madrid (UCM) (cum laude con mención internacional), tras disfrutar de un contrato predoctoral financiado por la UCM y cofinanciado por el Banco Santander (2018-2022). Mi tesis recibió el Premio Extraordinario de Doctorado y el prestigioso Premio Miguel Artola (XV edición, 2023), otorgado por la Asociación Hispana de Historia Contemporánea (AHC). El resultado fue la monografía Entre calles y alcobas. Vida urbana, ocio y sexualidad en el Madrid popular de entreguerras (Madrid, CEPC, 2024; SPI: 36). En enero de 2023 me concedieron una beca posdoctoral Margarita Salas. Un año más tarde, obtuve una beca posdoctoral Juan de la Cierva en la Universidad del País Vasco. En octubre de 2025, obtuve una nueva beca posdoctoral de dos años en la Universidad de Valencia. A lo largo de estos años, he adquirido un sólido conjunto de habilidades científicas y técnicas, que incluyen conocimientos avanzados en investigación archivística, experiencia en la construcción de bases de datos, análisis estadístico (SPSS), sistemas de información geográfica y cartografía digital (QGIS, ArcGIS). He difundido estos conocimientos en diferentes entornos académicos. En primer lugar, dentro de mi grupo de investigación Espacio, Sociedad y Cultura en la Edad Contemporánea, a través de dos seminarios permanentes, en los que también asumí responsabilidades organizativas como secretaria. En segundo lugar, a través de la publicación de resultados de investigación, incluyendo 11 artículos (1 en prensa, 1 en revisión) en revistas de gran impacto como Ayer, Rúbrica Contemporánea y Arenal, así como 11 capítulos de libros en editoriales de prestigio como Routledge, Akal y Comares. He participado en 47 conferencias y seminarios, 14 de ellos en instituciones internacionales del Reino Unido, Francia, Italia y Portugal. También he asumido tareas de responsabilidad científica y liderazgo coordinando un dossier de próxima publicación y 5 conferencias y seminarios (uno internacional), así como participando en la organización de 19 eventos académicos. Además, he sido revisora de 6 revistas académicas, entre ellas Ayer, Hispania Nova e Historia Contemporánea. Mis estancias de investigación me han permitido difundir mi trabajo fuera de España y crear sólidas redes internacionales, en particular en la École des Hautes Études en Sciences Sociales (3 meses), la Universidad París 7 (3 meses) y la Universidad París 1 (12 meses), todas ellas financiadas mediante becas competitivas. También he sido miembro de los equipos de investigación de 6 proyectos de investigación nacionales (2 en curso). He participado en 22 actividades de divulgación científica y transferencia de conocimiento (programas de radio, exposiciones, mesas redondas y paseos históricos). He impartido clases a alumnos de grado y de máster (16 ECTS, 11 cursos) y he participado en 8 proyectos de innovación docente. También he impartido clases como profesora visitante en la Universidad París 1, la Universidad París Nanterre y la Universidad Pontificia Bolivariana. He sido codirectora de un Trabajo de Fin de Máster (Universidad del País Vasco) y actualmente co-dirijo una tesis doctoral (Universidad Complutense de Madrid) financiada mediante una beca predoctoral concedida por la Comunidad de Madrid.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: REVELLES LÓPEZ, JORDI
Referencia: RYC2025-056033-I
Correo Electrónico: jordi.revelles@gmail.com
Título: Arqueoecología de las Sociedades Prehistóricas Mediterráneas

Resumen de la Memoria:

Mi trayectoria investigadora se centra en la arqueoecología de las sociedades prehistóricas del Mediterráneo, combinando arqueología, arqueobotánica y paleoecología para reconstruir cómo las comunidades humanas transformaron y gestionaron sus paisajes desde el Mesolítico hasta la Edad del Bronce. Mi trabajo aborda tanto los usos de las plantas como la evolución del territorio y las respuestas sociales ante los cambios ambientales, mediante un enfoque interdisciplinar que integra palinología, arqueobotánica, análisis de paleoincendios, geomorfología y modelización cuantitativa de la vegetación.

He desarrollado una línea independiente y reconocible, basada en el análisis de registros sedimentarios de yacimientos arqueológicos, lagos y humedales del Mediterráneo occidental y oriental (Iberia, Baleares, Córcega, Creta), así como en contextos insulares extraeuropeos. Mis resultados han mostrado que las transformaciones de la cubierta vegetal en la Prehistoria no pueden atribuirse únicamente al desarrollo agrícola, sino también a prácticas como la explotación forestal, el consumo de combustibles, el pastoreo y la consolidación de asentamientos permanentes. Estas dinámicas favorecieron la configuración de paisajes antrópicos en mosaico.

En el ámbito metodológico, he introducido la modelización de paleovegetación en arqueología ambiental mediterránea, obteniendo las primeras reconstrucciones regionales de cubierta vegetal para Córcega. También he impulsado la integración de palinomorfos no polínicos (NPPs), microcarbones y análisis geoarqueológicos en el estudio de paisajes prehistóricos, ampliando significativamente el potencial interpretativo de la palinología tradicional. Actualmente doy un paso clave al incorporar análisis de sedaDNA para mejorar la detección de plantas cultivadas, silvestres y de uso económico que no dejan huella en el registro polínico o en los macrorrestos, situando mi línea de trabajo en la vanguardia de la arqueobotánica mediterránea.

He liderado cuatro proyectos competitivos como IP y colaborado en consorcios internacionales (MISTRALS-PALEOMEX, Global Paleofire Working Group, Changing the Face of the Mediterranean). He construido una red internacional sólida (73% de mis publicaciones incluyen coautoría internacional) y he realizado estancias en centros de referencia como CEREGE-CNRS, IBED (Ámsterdam), ISEM (Montpellier) y University of Plymouth.

La línea de investigación que planteo para esta convocatoria profundiza en dos ejes principales:

1. El papel de las primeras sociedades agrícolas en la configuración de los paisajes mediterráneos y en la transformación de los usos de las plantas, dando lugar a sistemas agroforestales complejos;
2. La manera en que las sociedades prehistóricas respondieron a presiones ecológicas (clima, hidrología, disponibilidad de recursos), identificando estrategias de resiliencia y organización social.

El proyecto propone un enfoque comparativo pan-mediterráneo, multi-proxy y multi-escalar que integra sedimentos arqueológicos, lacustres y de humedales. Sus resultados contribuirán a redefinir la relación entre sociedad y medio en la Prehistoria mediterránea, y proporcionarán referentes de larga duración útiles para la gestión patrimonial, la conservación de ecosistemas y las estrategias de adaptación al cambio climático.

Resumen del Currículum Vitae:

Mi trayectoria científica se ha construido sobre la integración de la arqueobotánica, la paleoecología y la arqueología del Mediterráneo, con el objetivo de comprender las dinámicas socioambientales de la Prehistoria Reciente. Durante el doctorado adquirí una sólida formación en análisis palinológicos, geoarqueología y reconstrucción paleoambiental, complementada con estancias en centros de referencia como GEODE (Toulouse), IBED (Ámsterdam), ISEM (Montpellier) y CEREGE-CNRS (Aix-en-Provence). Estas experiencias me permitieron incorporarme a equipos internacionales desde una etapa temprana y definir una línea de investigación propia centrada en la evolución del paisaje y su relación con los procesos culturales.

En la etapa postdoctoral, he consolidado una trayectoria independiente, liderando cuatro proyectos competitivos como Investigador Principal (Juan de la Cierva-Formación, Europa Investigación, PaleoFormentera y JdC-Incorporación), así como campañas de campo, sondeo y excavación en Banyoles-La Draga, Formentera y la Zona Volcánica de la Garrotxa. He dirigido equipos interdisciplinarios (arqueobotánica, geología, limnología, arqueología) y he desarrollado nuevas líneas sobre paleoincendios, vulcanismo y transformación del paisaje en la Prehistoria.

He publicado 38 artículos revisados por pares (10 como primer autor), con contribuciones destacadas sobre modelización de paleovegetación, antropización del paisaje en islas mediterráneas, evolución paleoecológica de humedales costeros y dinámicas de fuego en el Holoceno. Mi índice h es 15 (Scopus) y participo regularmente en congresos internacionales (80 contribuciones en 53 congresos, de los cuales 36 internacionales). La proyección internacional de mi investigación se refleja en que el 73% de mis publicaciones incluyen coautores de instituciones extranjeras.

Mi participación en proyectos internacionales como Changing the Face of the Mediterranean, Global Paleofire Working Group, MISTRALS-PALEOMEX ha fortalecido mi perfil colaborativo y ha ampliado mi experiencia en síntesis regionales, integración de proxies y análisis comparativos en arqueoecología. Asimismo, he desarrollado competencias clave en ciencia abierta, con contribuciones regulares a repositorios FAIR (Neotoma, European Pollen Database, GPWG) y un papel activo en la COST Action PalaeOpen, en tareas de armonización y estandarización de datos.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

En el ámbito docente, he impartido asignaturas de Prehistoria y Bioarqueología en la UAB, donde recibí la Distinción Docente 2020 de AQU, y he dirigido Trabajos de Fin de Máster en arqueobotánica y arqueoeología (URV). En 2025 fui profesor invitado en la Sapienza Università di Roma, Aix-Marseille Université, Université Côte d'Azur y Universitat de les Illes Balears. Además, formo parte de comités científicos y de evaluación en convocatorias internacionales, y ejerzo responsabilidades en asociaciones profesionales (APLE, ACBA), lo que refleja el reconocimiento de mi labor y mi implicación en la articulación de la comunidad arqueobotánica y paleoambiental.

Finalmente, mantengo un compromiso sólido con la difusión y transferencia del conocimiento. Colaboro con el Espai Cràter, el Museu d'Arqueologia de Catalunya y otras instituciones patrimoniales, integrando resultados arqueobotánicos y paleoambientales en proyectos museográficos.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: CAMPILLO PARDO, ALBERTO JOSÉ
Referencia: RYC2025-057195-I
Correo Electrónico: vitascam@gmail.com
Título: Reading the Enlightenment: Readership practices in the long 18th century Spanish Colonial World

Resumen de la Memoria:

I am a Postdoctoral Fellow with the ERC Project Before Copyright (ERC 101042034) at the Department of Archaeology, Conservation, and History at the University of Oslo. My background spans Europe and Latin America, supported by training in history and political science, which enables me to analyse the intersections between knowledge, institutions, politics, and culture. Overall, my research examines the commercial and political networks that enabled the exchange of ideas and knowledge between European territories and their colonies during the Early Modern period (16th to 19th centuries). I focus on how states regulated and promoted these networks through cultural and legal instruments such as censorship, printing privileges, and administrative norms, and how these measures influenced the circulation of knowledge. My research has been improved by my work in interdisciplinary settings with archivists, librarians, legal historians, philologists and data analysts.

The research line I intend to develop examines reading practices in the Spanish colonial territories between 1700 and 1830. The central hypothesis is that readership practices in this period were not merely passive receptions of European ideas. Rather, they constituted active spaces for reinterpretation, the creation of alternative knowledge systems, and the emergence of distinct, yet interconnected forms of Enlightenment thought. These practices position the Spanish colonies not only as receivers but as active contributors to the development of Enlightenment ideas, highlighting their role as a cause, rather than solely a consequence, of Enlightenment thought.

The project introduces innovation on four levels. First, it addresses a significant research gap by focusing on the largely understudied Hispanic colonial world of reading. Second, it bridges book history with the sociology of knowledge and the history of ideas. Third, it combines decolonial theory with Social Network Analysis to contextualize and map connections among early modern readers. Finally, it recovers the voices of silenced actors, repositioning the colonial world as a driver, rather than merely a consequence, of the Enlightenment.

Methodologically, the line integrates archival and bibliographic research with digital tools to identify patterns and differences in readership across colonial societies. Focusing on New Spain, New Granada, and Peru, the project adopts a thematic approach to explore engagement with scientific debates, law, religion, philosophy, and literature. Its analysis draws on a diverse range of primary sources, including marginalia, epistolary archives, manuscripts, periodicals, and censorship reports. Rather than cataloguing every example of readership practices, the project employs comparative case studies to highlight key patterns, commonalities, and differences. Through the study of readership, the project offers an innovative perspective that reframes the Spanish colonial world as an active site of knowledge production and exchange within the broader global Enlightenment.

Resumen del Currículum Vitae:

I am a Postdoctoral Fellow with the ERC Project Before Copyright (ERC 101042034) at the Department of Archaeology, Conservation, and History at the University of Oslo. Alongside my research, I lead the project's digital component, designing and managing the database and supervising the data-entry team, and I also teach in the department. Previously, I held a postdoctoral fellowship funded by the Margarita Salas program at the Universidad de Sevilla, carried out during a two-year stay at the Universidad Pablo de Olavide. I completed my PhD at the University of Seville in 2021 with the distinction sobresaliente cum laude and received the Premio Extraordinario de Doctorado. My background spans Europe and Latin America, supported by training in history and political science, which enables me to analyse the intersections between knowledge, institutions, politics, and culture.

Throughout my academic career, I have published 2 monographs, 6 peer-reviewed journal articles, and 9 book chapters, and coordinated 1 edited volume and 1 journal special issue. My first monograph *Censura expurgo y control en la biblioteca colonial neogranadina* (2017) is the first systematic study of inquisitorial censorship in colonial New Granada. My second monograph (2023), titled *Comerciantes Censores y Bibliotecas: circulación del libro entre España y Nueva Granada*, is a coedition between Universidad del Rosario and Universidad Javeriana (Colombia) and the Universidad Autónoma del Estado de México (ranked 76 among international publishers according to the SPI 2022 index), printed in both countries. I have also published in journals such as *Anuario de Estudios Hispano-Americanos* (Q2, JCR 2024), *Cuadernos Dieciochistas* (Q2, SJR 2024), and *Revista Memorias* (Q2, SJR 2023), and contributed chapters to volumes issued by high-impact publishers including Brill (ranked 8 internationally, SPI 2022), Palgrave Macmillan (ranked 10, SPI 2022), Comares (ranked 6 among Spanish publishers), and the Universidad de Sevilla (ranked 36). My research reshapes narratives of knowledge circulation and cultural exchange between Europe and the eighteenth-century Americas, with New Granada as a key connector. My work has been cited more than 40 times by scholars in the field.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: SÁNCHEZ ROMERO, LAURA
Referencia: RYC2025-054367-I
Correo Electrónico: lausanrom@gmail.com
Título: Understanding open-air and cave Palaeolithic occupations in the Horn of Africa and Southern Caucasus
Resumen de la Memoria:

I've worked in the three sites object of my PhD (Ambrona, Amalda and Aranbaltza), but also in the spatial analysis of Boxgrove (UK), Cueva de Teixoneres (Spain) and in the sites object of my postdoc at the UAB (María Zambrano): Cova Gran (Spain) and Grotta di Fumane (Italy). This project aimed to understand the spatial organization of the transition levels from the Middle to the Upper Palaeolithic of these sites, with similar chronology and context. During my postdoc at the HUJI, I worked on the sites of Ararat 1 and Kalavan 2 (Armenia) to understand the occupation patterns in this challenging landscape. Currently I'm a postdoc at the University of Seville (EIDIA-Horizonte 2027). Besides this, I'm collaborating in the sites of El-Kherba (Argelia), Dalarik (Armenia), Miocene localities in Turkey and in the Middle Awash Project as a GIS and spatial analysis specialist.

Research line: Comparative analysis of Middle Pleistocene archaeological occurrences and their spatial implications in two different regions, Armenia and Ethiopia. This project will compare two separate archaeological geographies, each with cave and open-air occupations, aiming to contrast contents of the open-air Ethiopian MSA occurrences of Aduma and Halibee (Middle Awash), and the open-air site of Kalavan 2 and the Ararat 1 cave in Armenia. These sites will be simultaneously studied to understand how early humans in these Eurasian and African settings exploited their respective landscapes. Innovations include: 1) the application of spatial studies into new region(s), one occupied exclusively by Homo sapiens and the other sampling a time period in a non-European geography where Neanderthals and anatomically modern humans were contemporary; 2) the development of new multivariate spatial analysis methods adapted to the particular circumstances and available data sets from open and closed occupations; and 3) the construction of a broad inter-regional comparative database to foster comparisons among different geographic regions.

These in situ Ethiopian collections are available via my membership in the successful Middle Awash Project. Comparisons among these excavated, dated, and technologically analyzed Ethiopian occurrences provide a unique African resource poised to inform via comparison with a Eurasian counterpart. The proposed comparative project with Ethiopian occurrences will thus expand on the ongoing ERC-TransCause project (PI: Dr. Ariel Malinsky-Buller). This is a newer and less mature series of palaeoanthropological investigations than the Ethiopian counterparts, but the potential for resolving questions related to Neanderthals and their successors in this part of the world is very high.

The inclusion of spatial studies from the early stages of this investigation, both at the small scale of the confined cave contexts and across the wider landscape being explored by open-air surveys, is a major way forward in palaeoanthropological investigations. My background and previous experience on similar sites and similar questions will add new avenues with which to explore the complexity of these Ethiopian and Armenian sites, and ultimately add them to the fabric of palaeoanthropological studies in western Europe and southern Africa, where the disparity between data from cave and open-air localities continues to be problematic.

Resumen del Currículum Vitae:

My professional career in research is extensive, since I've tackled the spatial study of several Paleolithic sites in Western Europe, applying multivariate analysis based on geoarchaeology and GIS techniques. During my PhD, I developed and tested a methodology and workflow for the spatial analysis of sites, regardless of chronology, context or origin of the data. During my postdoc at UAB (María Zambrano), I led the spatial study of the Middle-to-Upper Paleolithic transition levels of the sites of Cova Gran (Spain) and Grotta di Fumane (Italy), where this method developed during my PhD was applied. During my postdoc The Lady Davis Fellowship at the HUJI, I worked on the sites of Ararat 1 and Kalavan 2 (Armenian Highlands), in the framework of the ERC-TransCause project (PI: Dr. Ariel Malinsky-Buller). Currently, I'm a postdoc at the University of Seville (EIDIA-Horizonte 2027) and part of the research group HUM1089-PAMSUR; I've also joined the national (Proyectos Generación Conocimiento) project CROSSROADS or the study of La Pileta Cave. I'm the PI of a project funded by the Basque Country Government focused on the occupation patterns and spatial organization of Neanderthal sites in the Basque Country and co-PI of the project of Amalda I and Amalda III, investigating the last Neanderthals of the Basque Region.

The scientific contributions are numerous. Several publications derived from the PhD where methodology based on GIS, geostatistics and palaeotopographic reconstruction applied to open-air and cave sites was created. This work tested the efficiency of this method, pros and cons, depending on the availability and origin of the data, context, chronology, etc. From this work and the publication of these three sites (Ambrona, Amalda and Aranbaltza), this method has been used in other sites, such as Boxgrove, Cova Gran, Grotta di Fumane and Cova de Teixoneres (all published). This method has contributed to the generation of ideas and knowledge, as other researchers have used these publications, and in particular the method and workflow published in JARMT, for its application at their sites. This has allowed me to establish contacts with other groups that have been interested in the application of this method to their sites, such as the open-air site of Farāh II, El-Kherba (in process of publication), and the sites of Ararat 1 and Kalavan 2, the subject of my postdoc at HUJI. International collaborations are numerous (Italy, UK, Algeria, Israel, Armenia), as well the 3-years postdoc at HERC (University of California, Berkeley, USA), just after finishing my PhD. The years at HERC were key in my training and development as a researcher, allowing me to work alongside one of the most important researchers in paleoanthropology and access all of Prof. Howell's documentation of Ambrona and Torralba, leading its deportation to Spain (CENIEH). As part of HERC, I joined the Middle Awash Project and I'm working on some of its sites as a specialist in GIS and spatial analysis, as well as on the projects they carry out in Turkey. I'm a reviewer in several international peer-reviewed journals and expert evaluator of the Spanish Research Agency (Agencia Estatal de Investigación).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: MASCLANS LATORRE, ALBA
Referencia: RYC2025-057118-I
Correo Electrónico: alba.masc@gmail.com
Título: Arqueología de género y análisis funcional
Resumen de la Memoria:

Trajectory

My research career has been shaped by innovative contributions to use-wear analysis, Neolithic socio-economic reconstruction, Funerary archaeology, and gender archaeology. In recent years, I have led several projects on European Neolithic gender relations and the sexual division of labour (SDL), becoming one of the emerging specialists in prehistoric labour and gender analysis.

During my predoctoral stage (FI-AGAUR 2013-2016), I developed a pioneering methodology for the use-wear analysis of polished stone tools. This experimental programme, which documented how active surfaces transform through use, filled a major gap in archaeological research and established a replicable framework for international scholars. I also investigated Neolithic socio-economic and gender dynamics within the "Pit Burial" Horizon, laying the foundations for later multi-proxy approaches to funerary archaeology.

As a postdoctoral researcher (Fyssen Foundation 2017-2019; Juan de la Cierva-Formación 2020-2023), I expanded this line of inquiry by applying use-wear, isotopic analysis and radiocarbon modelling to Early Neolithic cemeteries across Central Europe. I acquired complementary training in R programming, flaked-tool use-wear, dietary isotopes, mobility isotopes and chronological modelling in collaboration with international institutions. This work included the study of thirteen Early Neolithic sites in France, Germany, Slovakia, Austria and the Czech Republic, strengthening international networks and enabling a comprehensive reconstruction of gendered labour and emerging inequalities during the transition to agriculture.

Research line

My central research question examines whether SDL emerged during the transition to farming. Focusing on Linearbandkeramik (LBK) burials, I analyse how everyday tasks were symbolically expressed at death. Through several funded projects, I have created a multidisciplinary dataset integrating osteology, gendered grave goods (via use-wear), dietary isotopes, mobility markers, and radiocarbon chronologies. This approach reveals pronounced sex-based differences in diet, mobility, tool use and funerary symbolism, offering new perspectives on SDL among early farming communities.

My work challenges traditional narratives that projected modern gender biases onto the past. By objectively identifying tasks through tool-use patterns and linking them to individuals and community organisation, I propose a more nuanced model of Neolithic social roles. Pilot studies in LBK cemeteries from Moravia to Alsace show: (1) clear symbolic differentiation of tasks in grave goods—men linked to woodworking, butchery and hunting; women associated with hide processing and related crafts; and (2) robust correlations between SDL and differences in age profiles, diet, mobility and musculoskeletal markers. These findings suggest that early SDL contributed to emerging inequalities during Neolithisation and shaped how farming societies expanded across Europe.

Neolithic gender studies and the investigation of SDL constitute a promising research line. Much more data, time and resources are required to fully develop its potential. The main objective of my future work is to further address SDL during the Neolithisation process in Central Europe by reconstructing spatial activity patterns within domestic areas.

Resumen del Currículum Vitae:

I am an archaeologist specialising in lithic analysis, focused on how the adoption of farming transformed prehistoric lifeways, with particular attention to gender dynamics. My research spans from gendered lithic use in the Linearbandkeramik and Pit Burial (NE Iberian) cultures to broader questions on labour organisation, gender relations and funerary temporalities in Neolithic societies.

I am among the few specialists in Spain able to integrate technomorphological and use-wear analysis with Bayesian modelling, isotopic datasets and skeletal stress markers. This interdisciplinary approach has advanced the understanding of socioeconomic and ritual dynamics in Central European and Western Mediterranean Neolithic communities, refining funerary chronologies, challenging static cemetery interpretations and proposing new models for gendered labour, mobility and diet.

My academic output includes 21 articles (19 Q1), three currently under review, more than 33 conference presentations, one monograph (BAR 2020), one edited volume (2022), and 14 book chapters. My h-index is 11 (Google Scholar, 409 citations). As a lithics specialist, I have worked on contexts from the Palaeolithic to the Iron Age and taken part in 22 excavations since 2006, five as field director.

My career has been supported by competitive grants, including a FI fellowship and two postdoctoral contracts (Fyssen and Juan de la Cierva). I have accumulated 29 months of international experience in France, Germany, Czech Republic, Italy, Slovakia and the UK, with long research stays at CNRS and the Landesamt für Archäologie, and active collaborations across Europe.

I have secured six research projects (five international, one national) as PI or co-PI, totalling 142,923.85 €, and have held roles in scientific and organising committees (AWRANA, JIA). I regularly give invited lectures, review for major journals, and have supervised undergraduate and graduate students, including a PhD candidate.

I also have experience in heritage management through ten months working in documentation, inventory and cataloguing at the Directorate-General for Cultural Heritage. My commitment to public engagement is reflected in participation in nine outreach projects funded by FECYT, Barcelona City Council and the CSIC, authorship of five dissemination publications, and frequent media contributions.

As my postdoctoral trajectory developed mainly in research centres without teaching duties, my teaching experience has taken the form of invited lectures at the Universities of Girona, Barcelona and the UAB. I hold positive AQU and ANECA evaluations, qualifying me for Profesor/a Contratado/a Doctor/a, Profesora de Universidad Privada and tenure-track lecturer. I am also a fully tenured secondary education teacher, with proven expertise in pedagogy, diversity, classroom management, conflict resolution and communication.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: MARECHAL, PATRICIA
Referencia: RYC2025-054334-I
Correo Electrónico: patricia.marechal@gmail.com
Título: Plato and Aristotle on Motivation and Agency: Ancient Greek Moral Psychology and Its Contemporary Implications

Resumen de la Memoria:

I work on topics at the intersection of moral psychology, ethics, and the philosophy of mind in ancient Greek philosophy. My research focuses on ancient theories of the soul and the different accounts of human and non-human motivation and agency that spring from these models. This interest extends to the works of Plato and Aristotle, Neo-Platonist philosophers, and ancient doctors. This work has led me to investigate how ancient philosophers connected their theories of human differences with psychological and ethical distinctions. My current projects span three overlapping areas. By and large, most of my research is devoted to (1) moral psychology and value theory in the works of Plato and Aristotle. But I also have conducted substantive research on (2) the history of materialism, with an emphasis on soul-body relations and the nature of the human soul in the works of Galen, and (3) the history of the concept of race and its applicability to Greco-Roman antiquity.

My work on Plato and Aristotle's value theory and moral psychology is the cornerstone of my research. It focuses on the connection between affective states and intellectual capabilities, the number and types of human motivations, and the extent to which these philosophers' moral psychological models are shaped by the recognition that we are social beings by nature. Some of my early work centers specifically on the relationship between bodily desires and reason, and the various ways in which Plato and Aristotle think that non-rational states can affect, distort, and influence rational judgments. My interest in the interplay between affective and rational states led me to explore Plato's views on this topic in the *Phaedo* and *Philebus*, and Aristotle's views on practical wisdom and why we cannot be practically wise without virtuous dispositions of character.

My second line of research focuses on the history of materialism in the philosophy of mind, specifically as developed by the Hellenistic doctor and philosopher Galen of Pergamum. I have explored Galen's materialism in three related pieces, where I examine Galen's puzzling claims in *Quod animi mores*, *On De propriis placitis*, and *De usu partium*. Galen claims both that the capacities of the soul are identical with the mixtures of the body and that the soul's capacities 'follow upon' those bodily mixtures. This seeming tension can be resolved by noting that the soul's capacities are constituted by, and hence are nothing over and above, bodily mixtures, but bodily mixtures explain the soul's capacities and not the other way around. Galen's proposal represents a distinctive position in the ancient debate on the relationship between soul and body.

My third line of research is on the history of the concept of race. In recent years, we have seen a proliferation of ground-breaking work to recover historical views on marginalized identities and to incorporate these topics into the historical narrative. As part of these efforts, a number of scholars are turning their attention to the history of race and racism. But when we look at the history of ancient Greek philosophy, such topics seem conspicuously absent. My work attempts to investigate the notion of race present in the works of Plato and Aristotle.

Resumen del Currículum Vitae:

I received my PhD in Philosophy from Harvard University's philosophy program in 2018. Since then, I have gained international recognition in the field of ancient philosophy in English-speaking countries, as well as in Germany, where I did a two-year research stay at Humboldt University, and in England, where I did a four-month research stay at Corpus Christi College and the Faculty of Classics at the University of Cambridge. I am currently an Assistant Professor ("Profesora Contratada") at the University of California, San Diego (an R1 institution, which is the highest status in the Carnegie Classification of Institutions of Higher Education). I have recently been appointed as Associate Professor ("Profesora Titular") of Philosophy with tenure at the University of North Carolina, Chapel Hill (also an R1 institution), starting in July 2026. I received my BA in Philosophy from the University of Buenos Aires in 2010, where I achieved the highest GPA that year. I received my MA in Philosophy from Tufts University in 2012. My doctoral dissertation was awarded the George Plimpton Adams Prize for the best humanities dissertation at Harvard University. Before joining the University of California, San Diego as a professor, I was an Assistant Professor in the Department of Philosophy and Classical Languages at Northwestern University (2018-2022) and a Wissenschaftliche Mitarbeiterin at Humboldt University in Berlin (2021-2022). At the University of Buenos Aires, where I obtained my bachelor's degree, I worked as a full-time teaching assistant in the philosophy department (2007-2010).

My research explores ancient theories of ethics and philosophy of mind in Plato, Aristotle, and Galen. I have published numerous works on moral psychology in Aristotle's texts, ethics, moral education, and psychology in Plato's work, and the philosophy of medicine and mind in Galen. My current monograph project, *Aristotle on Motivation and Agency*, examines Plato and Aristotle's philosophical positions on the types of desires that motivate us to act and the variety of agency failures related to them. I am also co-editing, with John D. Proios (University of Chicago), a volume entitled 'Crafting Race in Plato and Aristotle', which explores conceptions of human differences in these ancient authors and is currently in press at Oxford University Press (scheduled for publication in 2026). My work has appeared in leading journals of the history of philosophy, such as *Archiv für Geschichte der Philosophie* (SJR: Q1), *Phronesis* (SJR: Q1), *Apeiron* (SJR: Q1), *Ancient Philosophy* (SJR: Q1), *Journal of the History of Philosophy* (SJR: Q2), *Oxford Studies in the Philosophy of Mind*, and *Philosophy and Phenomenological Research* (SJR: Q1). I have also contributed chapters to edited volumes published by Oxford University Press and Routledge Press on ethics, medicine, and ancient psychology, and I have written numerous book reviews for prestigious journals. I am a founding member of the Open Plato Project, a digital humanities project (www.openplato.org/alciades/). In addition, I am co-editing with André Rehinder (Paris Nanterre) the 'Critical Guide to Plato's *Phaedrus*', which is currently under contract with Cambridge University Press.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: SANCHEZ ALONSO, SARA
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Título: Neurociencia del desarrollo del lenguaje: Integración de neuroimagen y modelos computacionales

Resumen de la Memoria:

My research program investigates how the developing brain supports language learning in the first five years of life and why children follow diverse language trajectories. I address two major gaps: the lack of child-friendly neuroimaging and experimental protocols and the limited understanding of how environmental factors shape early language neurobiology. To this end, I develop multimodal (fMRI-fNIRS) and naturalistic paradigms and apply machine-learning methods to large-scale developmental datasets to model neurobehavioral variability and predict language outcomes.

Methodologically, I have led several innovations that are now used in multi-site studies: the first simultaneous full-head fMRI-fNIRS protocol in adults; the open-source PrimeNet framework for predictive modeling of neurobehavioral variation; and an anatomically informed scalp-based parcellation for longitudinal fNIRS. Conceptually, I proposed an influential model linking statistical learning, multimodal input and specialization of language circuits, and a quantitative framework that separates within-subject and between-subject components of neural and behavioral variation across development. These contributions provide the theoretical and analytical foundation for my current and planned work.

My independence is supported by competitive funding and leadership of large collaborative projects. I am a PI on an NSF grant (\$747,000) that underpins a longitudinal multimodal study of language-related brain networks in early childhood and the PI on an internal Yale Faculty Development award to validate a social language localizer using simultaneous fMRI-fNIRS. I have also been a co-investigator on NIH and Bill & Melinda Gates Foundation grants and led a large-scale study of Spanish verb learning with 142 children in Venezuela, as well as a major international consortium that produced the field-wide fNIRS glossary and reporting standards. My work has been recognized through a Young Investigator Award from the Brain & Behavior Research Foundation and the Postdoctoral Merit Award from the Society for the Neurobiology of Language.

My career is strongly international. I trained in Spain, the Netherlands, Germany, and the United States. I obtained an Erasmus Mundus Master's in Clinical Linguistics from the University of Groningen (The Netherlands) and a PhD in Linguistics and Neuroscience from Yale University. I have spent 15 years in international research environments and maintain long-term collaborations with institutions in the US, UK, Canada, the Netherlands and Taiwan. I have held leadership roles at Yale's Wu Tsai Institute for Neuroscience and the Poorvu Center for Teaching and Learning, co-organized the 2024 Yale fNIRS Workshop and served on the program committee of the Flux Congress for Developmental Cognitive Neuroscience. I am an ad hoc reviewer for more than 20 journals and regularly evaluate proposals for the US Graduate Women in Science National Fellowship Program, thus contributing to international evaluation and standard-setting.

As co-director of the Language, Learning and Multisensory Brain Lab at Yale, I supervise a multidisciplinary team, coordinate complex longitudinal studies, and mentor undergraduates, master's and PhD students. I am first author on ~80% of my peer-reviewed articles and have delivered over 70 conference presentations and 14 invited talks.

Resumen del Currículum Vitae:

I am an Associate Research Scientist at the Yale Child Study Center and co-director of the Language, Learning and Multisensory Brain Lab, where I lead an independent research program on language neurodevelopment. My work examines how the developing brain supports language learning in the first five years of life and why children follow diverse language trajectories. My program of research integrates multimodal neuroimaging (fMRI, fNIRS), large-scale developmental datasets and computational modeling. I obtained a B.A. in Translation and Interpreting (University of Granada), an Erasmus Mundus M.Sc. in Clinical Linguistics (University of Groningen), and a Ph.D. in Linguistics and Neuroscience (Yale University). I subsequently completed a postdoctoral fellowship at Haskins Laboratories before taking up my current position at Yale.

Scientifically, I have contributed methodological, conceptual and empirical advances to the study of language neurodevelopment. I developed the first full-head simultaneous fMRI-fNIRS protocol, an anatomically informed scalp-based parcellation optimized for longitudinal fNIRS data, and the open-source PrimeNet framework for predictive modeling of neurobehavioral variation. Conceptually, I proposed an influential model of language neurobiology in early development and a quantitative framework that separates within- and between-subject components of neural and behavioral variation across development. I am the author of over 20 peer-reviewed publications in journals such as Brain and Language, NeuroImage, Developmental Cognitive Neuroscience and First Language.

My independence is demonstrated by a strong funding record. I am Principal Investigator on a National Science Foundation grant that supports a multimodal longitudinal study of language-related brain networks in infancy and early childhood, and on a Yale Child Study Center Research Faculty Development Fund award to validate a social language localizer using simultaneous fMRI-fNIRS. Previously, I received a Young Investigator Award from the Brain & Behavior Research Foundation to model social communication deficits using multimodal imaging.

My research has a strong societal orientation, focused on developing computational tools and knowledge that can improve outcomes for children at risk of language and social difficulties. I have led the development of child-friendly, low-cost neuroimaging protocols (e.g., fNIRS longitudinal studies and experimental protocols, a developmental scalp-based parcellation for fNIRS studies) and open-source software (e.g., PrimeNet software for prediction of neurobehavioral variation). I work closely with public institutions and end-users (e.g., clinical and developmental research groups) to design studies that address real-world needs in early detection and intervention. Through outreach activities (e.g., the Yale Ciencia & Seeds of Success)



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

mentoring program for high-school girls), I actively promote equitable access to science and the responsible use of computational and neuroimaging tools in society.

Training and mentoring young researchers is a central part of my career. As a mentor, I have supervised 14 undergraduate students, several master's and Ph.D. projects, and a multidisciplinary lab team, with the goal of training the next generation of researchers at the interface of language, brain, and development.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: VALMISA OVIEDO, MERCEDES MARÍA
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Título: Relational Agency and Global Philosophy

Resumen de la Memoria:

I am a philosopher of action and a sinologist whose combination of skills is exceptionally rare in international academia and virtually nonexistent in the Spanish system. My work integrates advanced training in metaphysics, social philosophy, Classical Chinese, philology, manuscript studies, and material culture--areas that almost never converge in a single researcher.

My academic trajectory reflects this uniquely multidimensional formation: degrees from Princeton University (PhD), National Taiwan University (MA), the Autonomous University of Madrid (MA), and the University of Sevilla (BA), combining philosophical expertise with the most advanced sinological competence. What sets my work apart is not simply interdisciplinary, but the capacity to generate new philosophical insights by bringing a tradition marginalized in Western contexts--early Chinese thought--into direct and transformative dialogue with contemporary debates. This non-parochial, globally oriented approach represents the kind of philosophy that the 21st century requires: intellectually ambitious, methodologically pluralistic, and open to conceptual transformation. It expands the discipline beyond the already untenable limits of the Anglo-European canon and grounds it in a genuinely global vision.

From this unique position, I am reshaping how agency is understood in contemporary philosophy, advancing a conception of action grounded in relational and sociomaterial processes. My work shows that agency is not a capacity owned by individual humans, but a distributed process emerging from heterogeneous human and nonhuman actors, including material objects, infrastructures, environments, roles, and institutions. This vision has taken shape in my two monographs. *Adapting: A Chinese Philosophy of Action* (Oxford University Press, 2021) proposed that effective human relational action required adapting to the affordances and behavior of surrounding actors, rather than exercising unilateral, individual will and effort. *All Things Act* (Oxford University Press, 2025) developed the metaphysical foundations of this conception of agency, creating a deliberately pluralistic framework drawing from Chinese and analytic metaphysics, physics, biology, sociology, and artistic practice.

I have co-authored a Cambridge Element on the ethics and methods of researching unprovenanced artifacts from East Asia, as well as 11 peer-reviewed journal articles and book chapters. My work has had enormous impact: positive book reviews, citations, downloads, adoptions in courses worldwide, invitations to deliver keynotes and lectures across the Americas, Europe, and Asia, and recognized through multiple fellowships and awards supporting the internationalization, collaborations, and sustainability of my research agenda.

I am committed to public-facing scholarship, knowledge transfer, pedagogical initiatives, and creative philosophical engagement that brings my global research to bear on issues of contemporary relevance beyond academia. Across public-facing publications, public lectures, podcasts, interviews, and experiential pedagogies, my goal is both analytical and transformative: to recover and reinterpret Classical Chinese thought while using it to reshape ongoing conversations in philosophy and inform public discourse, demonstrating the sociopolitical significance of my work.

Resumen del Currículum Vitae:

I am a philosopher of action and sinologist working as Associate Professor of Philosophy at Gettysburg College, PA, USA (2018-present), with a previous postdoctoral research position at University Erlangen-Nuremberg (2017-18). Trained across Spain, East Asia, and the United States at the University of Sevilla (BA), Autonomous University of Madrid (MA), National Taiwan University (MA), and Princeton University (PhD), my unique profile combines expertise in social philosophy, agency, metaphysics, material culture, sinology, and the Chinese tradition.

My scholarship is internationally recognized and influential. My monographs, *Adapting: A Chinese Philosophy of Action* (Oxford University Press, 2021) and *All Things Act* (Oxford University Press, 2025), develop relational frameworks for agency, and are widely reviewed, cited, adopted in courses globally, and discussed in invited lectures, keynotes, and collaborations. My co-authored open-access Cambridge Element is a reference for scholars and cultural heritage professionals. I have published 11 peer-reviewed articles and chapters in leading journals and presses, including *Inquiry*, *Early China*, Routledge, and Bloomsbury.

My research has been supported by competitive fellowships and awards like the Mellon Foundation and the Taiwan Ministry of Education, demonstrating global confidence in my work and enabling long-term collaborations across continents.

I have cultivated leadership and influence across continents. I am President of the Association of Chinese Philosophers in North America (ACPA, 2024-25), served on the elected board of the European Association for Chinese Philosophy (EACP, 2019-25), co-founded the Iberoamerican Network of Chinese Philosophy, and organized major international workshops and conferences. As Associate Editor of the journal *Philosophical Explorations*, a regular reviewer for leading journals and presses, and evaluator in international committees like the Belgium Fund for Scientific Research, I shape the international field of Chinese and global philosophy. I serve as an international consultant on a National Social Sciences Funds of China project (2025), and on the team of a PEICTI project (Spanish Ministry of Science and Innovation, 2025), in process.

Mentorship and pedagogy are central to my work. I have guided over thirty undergraduate theses (TFM), advise PhD candidates at Princeton and the Chinese University of Hong Kong, and mentored early career scholars, including underrepresented groups, fostering globally capable philosophers.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My scholarship reaches beyond academia through public-facing work: essays on Aeon and Rujiawang, podcasts, blogs, YouTube lectures, public talks at cultural centers, and performances in philosophical plays that make Chinese thought experiential and accessible. Across these activities, I shape contemporary philosophical debates and public discourse.

My career demonstrates a deliberate internationalization that combines intellectual rigor, independence, and leadership. Returning to Spain, I am prepared to leverage my unique profile, global networks, and demonstrated leadership to establish a world-class center for Chinese and global philosophy, producing transformative research, mentoring the next generation of scholars, and positioning Spanish academia at the forefront of internationally relevant philosophical inquiry.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: LOZANO SÁNCHEZ, ITZIAR
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Título: Early mechanisms and markers of language development in typical and atypical development during the first two years of life.

Resumen de la Memoria:

I investigate early developmental mechanisms and behavioral and neural markers of language development in typical and atypical development during the first two years of life. I have a particular interest in infants at elevated likelihood for autism (EL-infants), by virtue of having an autistic older sibling.

Five are my most relevant scientific discoveries. First, thanks to La Caixa Fellowship for M.A. studies with Prof. Laura Bosch (UB), I found that neurotypical infants use different strategies to learn new words depending on their language experience (hearing one or two languages). Thus, different typical developmental pathways exist, and all can lead to optimal language acquisition.

Second, in my Ph.D. at UAM, I discovered that EL-infants attend less to the mouth of speaking faces than neurotypical infants at the end of the first year. Looking at the mouth in infancy matters for later language, so this may explain the language atypicalities this at-risk population shows and guide future interventions.

Third, in my postdoc at the U. of Warsaw, I found that key early neural markers of word acquisition (semantic integration, indexed by N400 effects in brain responses) are not present across toddlerhood but emerge at 2 years, a time of rapid word learning. These findings were part of an international multi-lab EEG & ET study that I led. Our results could help identify early biomarkers of word learning success in clinical populations with language difficulties, like autistic children.

Fourth, during a 3-month invited research stay as a Research Associate at the Babylab of the Polish Academy of Sciences (PAS), in collaboration with Prof. Tomalski, I discovered that neurotypical female infants look more at the mouth of talking faces than males in the first year, and mouth-looking predicted a female advantage in language skills at 2 years. This opened a new research line on mouth-looking as a potential female protective factor in atypically developing populations.

To pursue this line and become an independent PI, I won a competitive grant from the Polish National Science Centre (SONATINA). My project, hosted at PAS, is a multilab collaboration between Poland, Italy, Sweden, and UK. We investigate whether mouth-looking is a female-specific protective factor for language difficulties in EL-infants. This topic is highly relevant in autism, as it may explain why language difficulties linked to autism are less frequent in females and may guide early interventions tailored by sex, while allowing me to cooperate with internationally renowned experts in autism. I did my fifth discovery at Uppsala U: in EL-infants, greater mouth-looking to real talking faces at 10 months predicts higher autistic traits and social challenges at 2 years.

Building on this discovery, the Ramón y Cajal fellowship will allow me to develop a novel paradigm that quantifies EL-infants' gaze to their caregivers' mouth in naturalistic interactions, chart their early mouth-looking pathways across 'live' and screen-based contexts, and assess their predictive value for later language and social difficulties. I will then co-design, with clinicians and caregivers, a tech-based intervention to promote adaptive mouth-looking in everyday interactions. My work will advance autism science, inform clinical interventions and public policy, and consolidate my full independence as a PI

Resumen del Currículum Vitae:

I am a developmental psychologist with an interdisciplinary and multimethod approach. My research focuses on identifying the earliest behavioural and neural markers of language development in typically and atypically developing infants, especially in autism, to develop earlier detection and interventions of language and socio-communication difficulties.

My early research career has been competitive, international, and interdisciplinary. My scientific contributions include: 1 monograph (PhD), 11 first-authored peer-reviewed publications in Q1-Q2 journals (8 JCR; 9 published and 9 as CA), 1 more under review in Dev. Sci., 24 international conference presentations (1st author in 18); 7 invited talks, 2 symposiums (1 organised), and manifold dissemination activities. I commit to transparency through Open Science, with 4 preprints, shared materials, code, data, 5 pre-registrations on OSF, and 1 published protocol in BMJ Open.

To date, I have secured €312,278 in competitive national and international funding: 1 mobility Scholarship for B.A. studies (€16,680), 1 Master's (La Caixa, €18,485) and 1 PhD scholarship (FPU Predoctoral Fellowship, €61,544), 2 international mobility grants (€7,203), 1 national mobility grant (€4,620), 1 postdoctoral fellowship (Juan de la Cierva, €64,600), and 4 grants I led as Principal Investigator (awarded in 2022-24): Sonatina 7, Polish National Centre of Science (€127,591 for 3 years; position 5th/11th of my panel; global success rate: 20.5%), and 3 grants (€10,882) funded by the Polish Ministry of Science & Higher Education (one within the Excellence Initiative). I secured funds to organise a workshop on eye-tracking analyses in Warsaw (€667). So far, I have participated in 9 projects (1 national, 8 international) carried out in collaboration with more than 40 researchers from 11 Babylabs: Babylab PAN & Multilab Lab (Poland), Multiling lab (UiO, Norway), Centre of Brain & Cognitive Development (UoL, UK), MEDEA Babylab Autism (Italy) DIVE Lab (UU, Sweden), UA Heidelberg (Germany), Baby Learning Lab (UBC, Canada), Infant Development Lab (FIU, USA), and APAL & TRABERITEA labs (UB; UAM; Spain). Thanks to my collaborations, I have developed skills for team building, lab management, grant writing, project and



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

budget management, scientific dissemination, and data analyses, and demonstrated leadership by independently running my grants. As PI, I now lead a 10-people team and a multi-lab international project in collaboration with 4 European Babylabs leading in autism research.

Beyond research, I contributed to teaching, mentorship, dissemination, and service. I have taught 150 hours at UAM, UEM and UDIMA, supervised 2 B.A., 3 M.A. students, 1 student in La Caixa mentorship program, and 1 Research Lab. I have also established formal partnerships with public and private institutions, such as Polish National Coordinators of Public Nurseries, or Scientific Institutes for Research, Hospitalisation & Health Care (I.R.C.E. Medea, Italy), and large consortia (British Autism Study of Infant Siblings) in the UK. I am an Early Career Member of the International Congress of Infant Studies, La Caixa Foundation Fellows Association, and support young scientists in their Mentorship Program. I review in Dev. Psychol, J. Autism. Dev. Disord., and Brain Mind Educ., and have represented PhD fellows at numerous Research Committees at UAM.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: DICHER, BOGDAN-AUGUSTIN
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Título: Metainferentialism and logical consequence

Resumen de la Memoria:

My research develops a proof-theoretic, inferentialist account of logical consequence grounded in the structure of inference rules rather than in truth-conditional semantics. I work within proof-theoretic semantics, treating meaning as determined by use, and investigating how introduction and elimination rules interact with the structural rules that govern proofs. A key theme throughout my work is that structural constraints themselves carry semantic significance and must be integrated into inferentialist accounts of meaning.

A first line of research concerns pluralism within proof-theoretic semantics. I have argued that the same logical vocabulary can sustain distinct consequence relations without altering meaning, both across different logical systems and even within a single proof calculus. This involves showing that definitional rules encode only the minimal structural information required for a connective's meaning, allowing the logical constants to remain meaning-invariant across structural variations. I have also analysed weak disharmony and defended a solution based on uniqueness: a connective is well-defined when its rules determine it up to notational equivalence. Relatedly, I have argued that multiple-conclusion proof systems are compatible with inferentialism, since the rules themselves already encode the information needed to understand such structures.

A second line of work addresses broader methodological questions in logic. I have challenged reflective equilibrium as a method for logical theory and argued against logical nihilism. Additional work examines bilateralism, focusing on the inferential contribution of both assertion and denial and their role in non-classical settings.

A major shift in my recent research, motivated initially by the consideration of radically substructural logics's systems in which reflexivity or transitivity may fail—and their role in solving semantic and logical paradoxes, exposes limitations of traditional proof-theoretic semantics, which presupposes these structural properties. Building on this, I have developed, with Francesco Paoli, a metainferential account of logical consequence. On this view, consequence is always a Tarskian (reflexive, monotonic, transitive) relating inferences to inferences, rather than formulae to formulae. This reconceptualisation allows proof-theoretic semantics to accommodate non-reflexive and non-transitive logics without abandoning inferentialist commitments.

Within this metainferential framework, I have proposed a reinterpretation of sequents as "inferential networks"—structures encoding pre-logical inferential relations such as incompatibility or material validity. Structural rules are then understood as transformations of these networks rather than as mere reflections of consequence-properties. This reinterpretation explains, for instance, how identity expresses the exclusivity of assertion and denial. Philosophically, I have developed a constructionist foundation for metainferentialism, viewing logic as a technology driven by explanatory power and theoretical coherence rather than by direct conformity to cognitive practice.

Across these strands, my work aims to update proof-theoretic semantics for the substructural age by reconceiving logical consequence in metainferential terms.

Resumen del Currículum Vitae:

I received my PhD in Philosophy from the University of Melbourne (2015), specialising in logic, proof theory, and the philosophy of logic. Since then I was a postdoctoral researcher at the University of Cagliari (2016–17) and at the Centre of Philosophy of the University of Lisbon (2017–20), later continuing there as a Junior Researcher (2020–23). In 2024 I joined the University of the Witwatersrand (Johannesburg, South Africa) as Lecturer. I am also an Associate Member (honorary) of the LanCog Group, The Centre of Philosophy of the University of Lisbon.

I have published widely in leading journals in logic and analytic philosophy, including *Mind*, *Synthese*, *Analysis*, *Ergo*, *Theoria*, *Review of Symbolic Logic*, *Philosophical Studies*, *Logique et Analyse*, *Erkenntnis*, and *Dialectica*. Recent work includes "Logical Metainferentialism" (with F. Paoli, *Ergo*, forthcoming) and "Non-foundationalist frameworks for logical metainferentialism" (*Synthese*, 2025). Earlier publications develop positions on bilateralism, logical pluralism, reflective equilibrium in logic, proof-theoretic semantics, and metainferentialism.

I have a proven track record of securing competitive funding, both as Principal Investigator and as member of the leadership team of large collaborative projects. Aside from my appointments to Lisbon, which were financed through personal grants awarded by FCT, I was the Principal Investigator of an FCT exploratory research grant on the "Objects and grounds of structural rules" (2023–24) and served as Local Coordinator, WP leader, and Steering Committee member of the MSCA Staff Exchange Network PLEXUS (2023). I was awarded the MSCA Seal of Excellence (2017). I have also been PI on a major NCN Poland Sonata proposal (awarded but declined) and have received further postdoctoral fellowships from FCT and CONICET (Argentina, declined).

My scholarly activity includes an extensive programme of invited and peer-reviewed talks: over forty presentations since 2016 at leading departments and conferences worldwide (St Andrews, ENS Paris, Utrecht, Buenos Aires, Rio de Janeiro, Turin, Valencia, Cagliari, etc.) I have delivered keynote lectures (Arche Centre, St Andrews, 2024, Polish Congress of Logic, 2025), contributed invited tutorials (e.g., at the 4th International Autumn School on Proof Theory, Utrecht or at the Buenos Aires Logic Group, 2023), and regularly participate in international events in my area of specialism.

I have teaching experience across undergraduate and postgraduate levels in logic, philosophy of language, epistemology, metaphysics, philosophy of mathematics, and applied ethics, taught in South Africa, Portugal, Italy, Romania, and Australia. I supervised postgraduate students at master's (Wits, 2024–25) and doctoral levels (SNS Pisa, 2023–25) and serve or have served on examination committees at SNS Pisa (2025) and Cagliari (2025, 26).



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I referee for leading journals (Mind, Analysis, Philosophical Quarterly, Philosophical Studies, Synthese, Studia Logica, Journal of Philosophical Logic, among many others) and for national funding agencies (Poland, Israel). I have organised several international conferences (Cagliari 2017, Lisbon 2023), workshops (Lisbon 2019, 2024) and seminar series (Lisbon 2023, Wits 2024) and maintain broad international research collaborations.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: GRZECH, KAROLINA ZOFIA
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Título: Epistemic meaning across languages: Building data-driven theory grounded in documentation and interaction

Resumen de la Memoria:

I am a linguist specialising in interaction, pragmatics and epistemicity, with a trajectory that combines international training, long-term fieldwork and leadership of competitive projects.

After initial studies in the social sciences in Poland, France and Argentina, I joined SOAS, University of London, for the MA (Language Documentation and Description, 2011) and PhD (Linguistics, 2017) training. My doctoral work on Upper Napo Kichwa, based on fieldwork in the Ecuadorian Amazon, resulted in an award-winning spoken corpus (DELAMAN Award for Excellence in Language Archiving) and a thesis describing the evidential system of the language.

Following my PhD, I held research and teaching posts in the UK, Sweden and Spain. At the University of Manchester, I broadened my work on interactional phenomena to include ideophones, combining corpus analysis with further fieldwork in Ecuador. In 2018 I obtained a postdoctoral research position at Stockholm University. As part of the Linguistic Diversity group, I began to progress towards work on methodological issues in pragmatic fieldwork, and the role of pragmatics in the definition and theory of evidentiality. At this stage, I also expanded my interest in evidentiality (source of information) to epistemicity: a broader notional domain concerning knowledge in general.

In 2020 I moved to the University of Valencia with my own project on endangered Quechua oral traditions, which combined corpus-building, interactional analysis and collaboration with Indigenous communities, and led to further international work on spoken corpora and epistemic stance. Since 2024, I hold a tenure-track position at Universitat Pompeu Fabra, where I am consolidating a research programme on epistemicity in interaction, supervising theses and contributing to international networks and editorial projects. Across these stages, I have led several competitively funded projects and co-created resources such as open-access corpora, positioning myself as an emerging reference point for research on epistemicity, evidentiality and interaction.

The proposed research line aims to contribute to interaction-based typology of epistemicity. Building on my prior work and expertise, the project scales up from language description to a comparative programme grounded in natural conversation.

The project focuses on one epistemically dense interactional context: gossip. Using existing corpora of several languages, it aims to identify comparable gossip episodes and analyse the linguistic and embodied resources speakers use to negotiate, calibrate and align knowledge when they talk about non-present others. The work will progress from fine-grained corpus annotation to comparative analyses and search for broader implications, and will combine methods from interactional linguistics with the goals of pragmatic typology.

By showing how everyday practices such as gossip reveal how speakers of different languages encode and negotiate knowledge, the project will advance pragmatic research, and contribute to linguistic theory. It will also have broader, socially relevant implications beyond linguistics, contributing empirically-grounded insights to debates on misinformation, [“fake news”](#) in public discourse, and the strategies we use for discursively create reality.

Resumen del Currículum Vitae:

I am a functional linguist specialising in pragmatics and the study of natural interaction. I trained in linguistics at SOAS, University of London (PhD 2017), after earlier studies in social sciences in Poland, France and Argentina. My competitively funded doctoral project on Upper Napo Kichwa, spoken in the Ecuadorian Amazon, was based on extensive fieldwork and focused on the use of evidentials and on building a spoken corpus of the language, which later received the DELAMAN Award for Excellence in Language Archiving (2021). My doctoral work introduced an analysis of evidentials as markers of epistemic Common Ground, later developed in peer-reviewed publications and adopted by other researchers for Quechuan and typologically distant languages such as Turkish.

Before starting my current tenure-track position in 2024, I held academic posts in the UK, Sweden and Spain. Across these appointments, I have pursued a research programme on evidentiality and related categories, integrating methodological, theoretical and typological perspectives on how speakers manage knowledge in interaction (linguistic epistemicity). With 22 peer-reviewed publications (three more in press) and three open-access corpora of Quechuan languages, I am consolidating an international profile as an expert on evidentiality in Quechuan and on epistemicity in interaction more broadly. I regularly present at international conferences and have delivered several plenary lectures. A forthcoming open-access volume, *Expanding the Boundaries of Epistemicity* (De Gruyter Mouton), for which I am first editor, will further strengthen my position in the field.

A key strength of my profile is securing competitive research funding. Since 2011, projects for which I have been PI or co-PI have obtained over 650,000 EUR from national and international agencies, including the Swedish Research Council, the Endangered Languages Documentation Programme and Google. These grants have supported technological innovation in language mapping, collaborative documentation of endangered Quechuan varieties, theoretical work on evidentiality and epistemicity, and the creation of a North-South Epistemic Network that brings together researchers from eight countries. I am also corresponding PI on an ERC Synergy grant proposal currently under evaluation, with a requested budget of over 9.6 million EUR.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My trajectory also includes substantial service and knowledge-transfer work. I served on the Scientific Committee of SLE (2020–2025), sit on editorial and advisory boards, and review for journals, funding agencies (NSF, ELPD) and evaluation bodies. Beyond academia, I co-founded the non-profit Language Landscape, focused on innovative language mapping and outreach on linguistic diversity, which I co-directed for nearly a decade. I have led collaborations with industry (e.g. SDL Trados) and co-created educational materials and films with Indigenous partners.

Teaching and mentoring are integral to my work. I have taught BA and MA courses in several countries, currently supervise BA and MA dissertations and a PhD project, and have served on MA and PhD committees in Europe and Latin America. I actively support early-career researchers and Indigenous collaborators, particularly those working on evidentiality, epistemicity and Quechua, including native speakers documenting their own varieties.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: OJEA-QUINTANA IMAZ, IGNACIO
Referencia: RYC2025-056507-I
Correo Electrónico: ignaciooja@gmail.com
Título: Dinámicas de Normas Sociales Digitales

Resumen de la Memoria:

I am currently an Assistant Professor at the Munich Center for Mathematical Philosophy (MCMP, LMU), one of the world's leading centers for formal philosophy, where I lead the research area in Data Science and Applied Machine Learning. My trajectory is defined by excellence and a high degree of international mobility: after obtaining my Bachelors at the University of Buenos Aires, I pursued my Ph.D. at Columbia University (2019) under Philip Kitcher, I secured a competitive Research Fellowship at The Australian National University (ANU) (2019-2022) before joining LMU.

My research profile lies at the intersection of Social Epistemology, Philosophy of AI, and Computational Philosophy. I combine traditional philosophical analysis with advanced data science techniques (Agent-Based Modeling, NLP, Machine Learning, Reinforcement Learning) to study how information spreads in social networks and how AI systems influence human epistemic practices. My goal is to advance the research on "digital social norms," modeling them as forms of social habituation using multi-agent reinforcement learning validated by social media data.

My contributions are clustered into two main avenues (referencing the 10 selected merits in the CVA):

A. Formal Epistemology and Consensus Modeling (Reference to CVA Merits: #10 J. Phil Logic, #3 Erkenntnis, #8 Biology & Philosophy, #9 Erkenntnis). My earlier work focused on the mathematical foundations of aggregation and scientific coordination. Scientific Importance: This line of research challenges standard Bayesian assumptions by axiomatically determining good rules for probabilistic aggregation in contexts of disagreement. The core normative insight I defended is that consensus should be understood as "common ground"—a shared agreement that preserves the uncertainty of the group—modeled using Imprecise Probabilities (IP).

B. Computational Social Epistemology and Philosophy of AI (Reference to CVA Merits: #2 Synthese, #4 PLOS ONE, #5 Nature Humanities, #6 AAAI/ACM, #7 Social Science Comp. Rev). This line represents my "empirical turn," integrating Data Science and AI Ethics to study digital social dynamics. Scientific Importance: I moved beyond descriptive analytics to identify the normative mechanisms of online behavior.

LINE OF RESEARCH TO BE DEVELOPED: Dynamics of Digital Social Norms (DDSN)

Digital environments are reshaping our interactions, yet we lack a general theory of digital social norms. The field is currently blocked by a persistent normative-descriptive gap: large datasets reveal behavioral patterns (descriptive) but not the prescriptive force of norms, while formal models offer normative insight but lack empirical grounding.

Standard philosophical accounts, such as Cristina Bicchieri's (2006, 2016), define norms through complex cognitive states. This "top-down" framework is difficult to operationalize in digital settings where we only observe behavioral traces (clicks, likes, moderation actions) rather than mental states. My project, DDSN, bridges this gap by proposing a behavior-first account using Reinforcement Learning (RL). Instead of presupposing normative representations, I treat digital norms as social habits learned through trial-and-error in gamified environments.

Resumen del Currículum Vitae:

A. Personal Data

Researcher: Ignacio Ojea-Quintana Imaz

ORCID: 0000-0001-6941-7283

Scopus Author ID: 57192986742

Current Professional Situation: Ludwig Maximilian University (LMU) - Munich Center for Mathematical Philosophy

Professional Category: Assistant Professor

Start date: 2022

Keywords: Social Epistemology, Philosophy of AI, Computational Philosophy, Data Science.

Previous Professional Situation:

2019 - 2022: Research Fellow. The Australian National University (ANU), School of Philosophy.

2017 - 2019: Contemporary Civilization Instructor. Columbia University.

2012 - 2017: Dean's Fellow / Teaching Fellow. Columbia University.

2010 - 2012: Doctoral Fellow. CONICET (Argentina National Science Institute).

B. Profile

B1. International Leadership and Global Network. I have consolidated a strategic global network spanning top-tier institutions in North America, South America, Europe, and Oceania. I also had an active role in multi-disciplinary and large initiatives, such as the Cambridge-LMU Strategic Partnership and my experience at the Humanizing Machine Intelligence initiative (ANU). These lead to high-impact collaborations, integrating philosophical inquiry with computer science, which includes co-authored papers in venues such as Nature Humanities & Social Sciences Communications, PLOS ONE, Social Science Computer Review, and AAAI/ACM Conference on AI, Ethics, and Society (AIES). Additionally, during my career I have also single and co-authored papers in top philosophical journals like the Journal of Philosophical Logic, Erkenntnis, Synthese, Biology and Philosophy.

B2. Academic Management and Supervision. At LMU, I currently serve as the Teaching Coordinator for the Philosophy of Science Chair, managing the organization of approx. fifteen courses per semester. I also co-lead the Philosophy of Machine Learning Reading Group and have organized international events like the "MCMP Agent-Based Modeling Workshop" (2024). Regarding teaching, I have developed a Computational Philosophy Curriculum, which include courses like "Philosophy of Natural Language Processing", "Philosophy of Artificial Minds", "Philosophy of Data Science",



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

and many others. Regarding supervision, since 2019 I have supervised or co-supervised 3 PhD students, 5 Master's students, and 4 Bachelor's students, guiding them in cutting-edge topics such as Large Language Models probing.

C. Publications (Top 7)

1. Ojea Quintana, I., Peters, U. (2024). "Are Generics and Negativity about Social Groups Common on Social Media?". Synthese. (Joint first author).
2. Ojea Quintana, I. (2023). "Radical Pooling and Imprecise Probabilities". Erkenntnis.
3. Ojea Quintana, I., Reimann, R., Cheong, M., Alfano, M., Klein, C. (2022). "Polarization and trust in the evolution of vaccine discourse on Twitter during COVID-19". PLOS ONE.
4. Klein, C., Reimann, R., Ojea Quintana, I., et al. (2022). "Attention and counter-framing in the Black Lives Matter movement on Twitter". Nature Humanities & Social Sciences Communications.
5. Ojea Quintana, I., Rosenstock, S., Klein, C. (2021). "The Coordination Dilemma For Epidemiological Modelers". Biology and Philosophy.
6. Stewart, R., Ojea Quintana, I. (2018). "Learning and pooling, pooling and learning". Erkenntnis.
7. Stewart, R., Ojea Quintana, I. (2018). "Probabilistic Opinion Pooling with Imprecise Probabilities". Journal of Philosophical Logic.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: FLORIS FLORIS, GIACOMO
Referencia: RYC2025-054262-I
Correo Electrónico: giacomofloris@gmail.com
Título: The New Untouchables: Homelessness, Social Hierarchy, and the Meaning of Equality
Resumen de la Memoria:

My academic career is characterised by strong international mobility and sustained research development. Trained in Italy (BA and MA, University of Genoa) and the UK (MA and PhD in Political Theory, University of Manchester), I subsequently held research and teaching positions in Germany, Italy, and the UK. These experiences shaped a coherent research trajectory centred on the foundations of moral equality and the social and institutional conditions under which individuals can relate to one another as equals.

My early work focused on the meaning, explanation, and scope of moral status and basic equality, generating several important publications in leading venues. I developed a pluralist account of moral status that offers a non-speciesist justification for why (nearly) all human beings possess a moral status that is superior to that of nonhuman animals (Philosophical Studies, 2021), and I proposed an attitude-based theory of moral equality, according to which persons' equal moral status is grounded in a fitting, basic, and independent moral attitude (Ratio, 2023). I further explored the implications of this framework across different social relationships, arguing, for example, that children's equality before the state is grounded in a duty of respect (OUP, 2024), whereas their equal moral status in the eyes of their parents lies in a duty of parental love (Canadian Journal of Philosophy, 2023).

Building on my research into the value and justification of equality, my current work examines what a relational egalitarian society owes to socially excluded individuals, such as persons with mental illness, substance use disorders, or those engaged in sex work. This project has been supported by two of the most prestigious and competitive awards in Europe and the UK: the Marie Skłodowska-Curie Postdoctoral Fellowship and the British Academy Postdoctoral Fellowship. It has generated several key publications, including 'What We Owe to Impaired Agents' (Journal of Social Philosophy, 2024), 'The Invisible Social Class: Relational Equality and Extreme Social Exclusion' (Political Studies, 2025); 'What Is the Point of Harm Reduction? A Relational Egalitarian Perspective' (British Journal of Political Science, 2025), 'Relational Equality and Vulnerability to Social Disrespect' (Cambridge University Press, forthcoming). These publications collectively advance a unified philosophical agenda that deepens our understanding of relational equality by analysing its specific demands when applied to the most vulnerable and marginalised members of society.

Through the Ramón y Cajal programme, I aim to consolidate and expand this research by developing the first systematic relational egalitarian theory of homelessness as a form of unjust social hierarchy. This project will integrate my foundational work on the value of equality with my applied analyses of social exclusion, establishing a long-term research programme in Spain with strong international visibility. The fellowship will enable me to position myself as a leading contributor to contemporary debates on relational equality and social inclusion, while fostering collaborations with Spanish institutions and training early-career researchers in normative political philosophy.

Resumen del Currículum Vitae:

I am a British Academy Postdoctoral Fellow in the Department of Philosophy at the University of York. I previously held positions at the University of Hamburg, LUISS University (Rome), and the University of Manchester. I hold a PhD and an MA in Political Theory from the University of Manchester and an MA in Philosophy from the University of Genoa.

My scientific contributions include a monograph, *Una società di eguali [A Society of Equals]* (Il Mulino, 2024), a co-edited volume, *How Can We Be Equals?*, with Oxford University Press (2024), thirteen peer-reviewed journal articles in leading international venues such as the British Journal of Political Science, Canadian Journal of Philosophy, Journal of Applied Philosophy, Philosophical Studies, Political Studies, and Politics, Philosophy & Economics, as well as three chapters published by Oxford and Cambridge University Press. This record reflects sustained productivity, recognised excellence, and a strong international presence.

I have been the Principal Investigator of two prestigious fellowships: the British Academy Postdoctoral Fellowship and the Marie Skłodowska-Curie Postdoctoral Fellowship. I also contributed to securing a DFG research grant (€332,000). These awards demonstrate my ability to design and lead ambitious research projects, manage budgets, and deliver high-quality outputs. Overall, I have an excellent track record of securing external research funding, having successfully obtained more than €1,000,000.00 through both individual and collaborative projects.

I have extensive experience presenting my research at prestigious national and international conferences. I have presented my research at 48 academic events across 13 countries, including invited talks at Stanford University, the University of British Columbia, Universitat Pompeu Fabra, and the University of Oxford.

I hold the Italian National Scientific Habilitation for Associate Professor in Political Philosophy and received the Young Scholar Prize of the Italian Society for Analytic Philosophy.

I have significant teaching experience at both undergraduate and postgraduate levels across three major European universities: York, Hamburg, and Manchester. Throughout my teaching career, I have developed and delivered courses in various areas of moral and political philosophy. My teaching portfolio includes introductory courses designed to familiarize students with fundamental concepts and methods, as well as advanced modules exploring topics such as ideals of social justice, democratic theory, and distributive justice.

I have supervised one BA dissertation at the University of York and two MA dissertations at the University of Hamburg. In addition, I have informally mentored a PhD student at the University of Hamburg, providing feedback on their research and offering guidance on their publication strategy.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

I have organised 13 research events, including panels at leading international conferences, and have served on departmental research committees in York and Hamburg. I regularly act as referee for more than thirty international journals and as a grant reviewer for the British Academy, reflecting broad peer recognition and active academic citizenship.

Together, these achievements reflect a strong record of independence, leadership, and international impact.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: SAMPEDRO MELLA, MARÍA CARMEN
Referencia: RYC2025-057197-I
Correo Electrónico: marya_sm@hotmail.com
Título: Cortesía y pragmática de corpus

Resumen de la Memoria:

Licenciada en Filología Hispánica por la USC con Premio Fin de Carrera de la Xunta de Galicia (2010), mi trayectoria investigadora se inicia con la participación en el Proyecto PRESEEA-Santiago de Compostela (2006), que me permite formarme en técnicas de investigación, obtención y análisis de datos orales. Con la financiación de una beca predoctoral FPU comienzo una tesis doctoral sobre formas de tratamiento (FT) en la USAL (2011-2015) con un enfoque sociolingüístico. Mis primeras aportaciones en congresos y publicaciones se centran en el estudio empírico de las FT.

Mi trayectoria prosigue en la Universidade de Lisboa contratada como lectora e integrada como investigadora en el Centro de Linguística da Universidade de Lisboa (CLUL). Allí continúo mi investigación sobre FT ampliando el campo de estudio con datos del portugués y de la interlengua de mis estudiantes. Las diferencias culturales entre España y Portugal, manifestadas en las FT, conllevan un cambio en mi enfoque de análisis: de la sociolingüística a la pragmática (socio)cultural. Asimismo, mi trabajo como responsable docente de seis asignaturas y mi colaboración con el CLUL hacen que me interese por el español como lengua extranjera (ELE), por los corpus de aprendices, a partir del trabajo con el corpus COPLE-2; por el estudio de la interlengua desde una perspectiva pragmático-discursiva y por la conexión entre la investigación empírica y la realidad del aula.

La concesión de una beca posdoctoral para desarrollar un proyecto de en el extranjero con el equipo CLESTHIA de la Univ. Sorbonne Nouvelle me lleva, sin abandonar la cuestión de las FT, a comparar datos de aprendices de ELE francófonos y lusófonos (tarea interrumpida por la pandemia). La estrecha colaboración con el equipo y la demanda docente me llevan también a interesarme más por el potencial de los corpus en la investigación y enseñanza de ELE. Esta línea supone un nuevo rumbo en mi trayectoria, que se asienta con la presentación y publicación de distintos trabajos y la organización de encuentros científicos con el equipo CLESTHIA, además del Congreso Internacional Aplicaciones de la lingüística de corpus en la didáctica de las lenguas.

Con un nuevo contrato de investigadora posdoctoral en la USC, desarrollo un segundo proyecto sobre el estudio contrastivo de la interlengua centrándome en datos nativos para poder aportar una visión comparativa pragmático-discursiva. Los problemas para el análisis de la lengua en uso encontrados desde que comencé la tesis doctoral me llevan, en esta etapa, a proponer mejoras. Para ello, a partir de una estancia en la UCLouvain (Bélgica), inicio una colaboración con equipos de universidades belgas que trabajan en análisis del discurso, corpus, variación y pragmática. Con la obtención de un proyecto financiado sobre etiquetado pragmático de corpus, que estoy desarrollando actualmente con una investigadora en formación, me especializo en pragmática de corpus. Así, sin abandonar el estudio de la cortesía y las FT, trabajo en el diseño de una herramienta aplicada a varios corpus, que permita la recuperación de información pragmático-discursiva, como actos de habla. Gracias a la concesión de una Acción HORIZON-MSCA-2023, desde febrero de 2025 continúo desarrollando las líneas de investigación relativas al estudio de las FT en la UCLouvain.

Resumen del Currículum Vitae:

Licenciada en Filología Hispánica en la USC con Premio Fin de Carrera de la Xunta de Galicia a la excelencia académica (2010) y dos másteres en la USAL: Máster en Profesor de Educación Secundaria Obligatoria, Bachillerato, Formación Profesional y Enseñanza de Idiomas (2011) y Máster en Enseñanza del Español como Lengua Extranjera (2012). Me doctoré posteriormente en el programa Lengua Española: Investigación y Enseñanza de esta misma universidad, con un doctorado internacional y una tesis titulada *Las formas de tratamiento tú y usted en el español centro-norte peninsular. Estudio sociolingüístico*, calificada con sobresaliente cum laude (2016).

Entre 2011 y 2015 estuve vinculada al Área de Lingüística General del Dpto. de Lengua Española de la USAL como personal docente en formación, gracias a una beca de Formación de Profesorado Universitario (FPU). Durante mi formación predoctoral, formé parte del grupo de investigación ESVARÉS (Estudios sobre la variación del español) y combiné la enseñanza de Lingüística General y Lingüística Textual y Análisis del Discurso, y de español como lengua extranjera (ELE) en los Cursos Internacionales, con la investigación en sociolingüística del español. También realicé dos estancias en Portugal y Francia en centros de excelencia.

Entre 2016 y 2018 ejercí como profesora en calidad de lectora en el Dpto. de Linguística Geral e Românica de la Universidade de Lisboa, donde fui responsable de cinco materias de grado y de la asignatura Didáctica del Español en el Máster de Profesorado. También me integré como investigadora en el Centro de Linguística (CLUL), donde formé parte del grupo de investigación Grammar & Resources, lo que me permitió ampliar mi formación académica en un grupo internacional consolidado.

Gracias a la obtención de una beca de investigación posdoctoral de la Xunta de Galicia, llevé a cabo dos proyectos de investigación sobre cortesía, deixis social y pragmática intercultural en la Université Sorbonne Nouvelle (2018-2021) y en la USC (2021-2022). Primero estuve vinculada en el departamento EILA (Études ibériques et latino-américaines) y al grupo de investigación CLESTHIA. Además de ser responsable cuatro materias de grado y una de máster, tuve la oportunidad de colaborar con varios equipos de investigación y de participar en las actividades de investigación desarrolladas en CLESTHIA.

Entre 2021-2024 estuve vinculada como investigadora posdoctoral contratada al GI Gramática del Español y al Dpto. de Lengua y Literatura Españolas, Teoría de la Literatura y Lingüística General de la USC. He compaginado la docencia de las materias Lengua Española y Análisis del Discurso con la investigación empírica en lingüística de corpus, análisis del discurso y pragmática. En 2022 conseguí un nuevo proyecto financiado sobre etiquetado pragmático de corpus lingüísticos: *Explotación de corpus generales y de aprendices para la investigación y la enseñanza del discurso en el español como lengua extranjera (ELE)*. Gracias a este proyecto, he desarrollado una nueva línea, la pragmática de corpus, con el fin de potenciar el empleo de los corpus en la investigación y la enseñanza de la lengua en uso.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Desde febrero de 2025 trabajo en la UCLouvain, gracias a la obtención de una Acción MSCA. Trabajo en un nuevo proyecto sobre tratamiento en varias lenguas y el enriquecimiento pragmático de los corpus.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: MIRELES FLORES, LUIS
Referencia: RYC2025-054975-I
Correo Electrónico: mireles-flores@proton.me
Título: Philosophy of causality in the social sciences and policy making

Resumen de la Memoria:

After my PhD defense at Erasmus University Rotterdam, I started a post-doctoral research career at TINT, Centre for the Philosophy of the Social Sciences, at the University of Helsinki. I am currently Academy Research Fellow and the Principal Investigator (PI) of a project funded by the Research Council of Finland, based at the Centre for Philosophy of Social Science (TINT), at the University of Helsinki. I have published peer-reviewed articles in highly recognized philosophy of science journals, and in economic journals as well, including *International Studies in the Philosophy of Science*, *Review of Political Economy*, *Studies in History and Philosophy of Science*, and *The History of Economic Thought*. I have presented my work at numerous international conferences in the field of philosophy of science, philosophy of economics, and history of economic thought. Some examples include conferences at universities in Germany, Finland, USA, Japan, Mexico, Argentina, United Kingdom, The Netherlands, Spain, Italy, Poland, Canada, and South Africa. Through international connections of TINT I have extended my already strong academic network that I started building as a founder and editor of the *Erasmus Journal for Philosophy and Economics (EJPE)*, which over time has gained prominence in the field of philosophy of economics. I have been visiting scholar in several top-ranked international institutions, such as the Department of History and Philosophy of Science, University of Cambridge, UK, and the prestigious and internationally recognized Institute for Advance Studies (IAS) in Princeton, USA. I also have experience coordinating international academic events, for instance, I was chair of the local organizing committee of the 14th conference of the International Network for Economic Method (INEM), hosted at the University of Helsinki. The line of research I project to develop is titled: Causality in empirical economics: a novel pluralist and bottom-up perspective. With this project I plan to significantly move forward the philosophical debates on the policy relevance of economics. The main general goal of the project will be to develop a bottom-up, contextual, and interdisciplinary approach to the policy relevance of causal knowledge, founded on a pluralist philosophical stance on causality and causal evidence. I will apply this approach to some real-life cases of science-based policy deliberation. The chief research objectives are to: 1) identify the main elements involved in the process of policy making in accordance to state-of-the-art public policy research; 2) characterize the role of different methods of causal inference and evidential techniques in relation to the different stages and relevant dimensions of the policy process; 3) investigate whether the aims and outcomes of science production are in line with the aims and requirements of the process of policy making. The planned project will involve inter- and trans-disciplinary exchanges among literature in the social sciences, public policy studies, and philosophy of science. This innovative research project will provide new perspectives on the various roles that causal notions and methods of causal inference can have in the complex interactions between scientific knowledge production in economics and the process of policy making. The results will also be potentially valuable to policy makers.

Resumen del Currículum Vitae:

Name: Luis
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Tel: +358403247782
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I have a BA in economics which I earned at ITAM in Mexico City. I have obtained a Master in Science degree in philosophy of the social sciences at the London School of Economics in the UK, and subsequently I pursued my PhD in philosophy at Erasmus University of Rotterdam in The Netherlands. After obtaining my PhD, I started a postdoctoral research career at TINT, Centre for the Philosophy of Social Sciences, at the University of Helsinki, Finland, where I am currently the principal investigator of the research project “Causality, empirical economics, and the economy” funded by the Research Council of Finland [call 2022]. My current position at the University of Helsinki is Academy Research Fellow at TINT, Practical Philosophy Department.
Relevant Publications:
Mireles-Flores, L. (2024) Causal knowledge and the process of policy making: towards a bottom-up approach. In *The Routledge Handbook of Causality and Causal Methods*, eds. P. Illari, and F. Russo. London: Routledge, 571-587. ISBN: ‎978-1032260198.
Mireles-Flores, L. (2022) The evidence for free trade and its background assumptions: how well-established causal generalisations can be useless for policy. *Review of Political Economy*, 34 (3): 534-563.
Mireles-Flores, L., Nagatsu, M. (2022) Methodology and philosophy of economics: a tale of two biases. *The History of Economic Thought*, 64 (1): 33-57.
Relevant Academic Visits:
I have held academic visits at several top-ranked international institutions:
Visiting Scholar at the Department of History and Philosophy of Science, University of Cambridge, UK. January to April 2025. Invited by Prof. Anna Alexandrova.
Visiting Scholar at the Institute for Advance Studies (IAS), School of Social Science, Princeton, NJ, USA. January to July 2021.
Other significant academic merits:
Organizer of the Symposiums connected to the Finnish Research Council project “Economics as serviceable social knowledge (ESSK)”, TINT, University of Helsinki, Finland. September 2021 to the present.
Chair of the organizing committee of the 14th conference of the International Network for Economic Method (INEM), Helsinki, Finland. August 2019.
Co-editor of the Special Issue on contributions to the 14th INEM conference. *Journal of Economic Methodology*, 2022, vol. 29, issue 2.
Editor of the Special issue in honour of Mark Blaug. *Erasmus Journal for Philosophy and Economics*, 2013, vol. 6, issue 3, [I was the editor of the whole special issue]



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Founder and co-editor of the Erasmus Journal for Philosophy and Economics (EJPE): peer-reviewed academic journal. I was editor of the journal from 2008 to 2015. I also was the designer and webmaster of the website (up to 2016).

Organizer of the Perspectives of Science (PoS) Research Seminar, a prestigious bi-weekly seminar at TINT, Practical Philosophy, University of Helsinki. The PoS Seminar is devoted to presenting state-of-the-art research by leading and promising philosophers and social scientists. Since 2023, I am responsible of managing and inviting keynote speakers for the sessions.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: GONZALEZ CABRERA, IVAN DARIO
Referencia: RYC2025-055067-I
Correo Electrónico: idgonzalezc@gmail.com
Título: Evolution of Cooperation and Normative Cognition

Resumen de la Memoria:

My research examines the evolution and psychology of normative cognition, focusing on how people interpret moral disagreement and how these interpretations shape cooperation. I address these questions by combining philosophical analysis, psychological studies, and formal and computational modeling. This combination has enabled me to develop a unique research program explaining how metaethical attitudes develop, differ across contexts, and affect cooperative dynamics.

My academic trajectory began at the Australian National University, where my doctoral work with Kim Sterelny developed an evolutionary account of shared and enforced norms grounded in cooperative pressures. This work proposed that normative guidance and claims of moral objectivity emerge from mechanisms supporting coordination in diverse social environments. At the Max Planck Institute for Evolutionary Anthropology, I extended this line of inquiry by integrating developmental psychology and evolutionary theory to study how children evaluate normative disagreements. My empirical work provided the earliest evidence that children distinguish objectivist from relativist interpretations of moral disagreement and that these distinctions vary across sociocultural contexts.

At the Konrad Lorenz Institute for Evolution and Cognition Research, I led my own postdoctoral projects on how cooperative demands, disagreement, and sociocultural variation shape the stability and diversity of human normative systems. As an SNSF Postdoctoral Fellow at the University of Bern and leader of one of the grant's subprojects, I expanded this program by investigating how sociocultural distance and political orientation influence adults' interpretations of moral disagreement. At the University of Konstanz, I consolidated this empirical research by leading cross-cultural studies in Germany, Turkey, and New Zealand that combined experimental methods, political psychology, and philosophical analysis.

In parallel, I developed a complementary modeling program to analyze the interaction between moral beliefs and metaethical attitudes. These agent-based simulations explore how cooperation demands affect the coevolution and stability of evaluative judgments. As Research Manager / Postdoctoral Fellow at the National University of Singapore, I expanded this line of research by designing formal models linking punitive behavior to the justificatory attitudes that structure norm enforcement. These models use integrated Monte Carlo and agent-based techniques to examine how evaluative cognition influences the efficiency and selectivity of punishment.

My future work will integrate these strands into a unified research program combining philosophical analysis, cross-cultural experimentation, and computational modeling to examine how context-sensitive shifts in objectivist and relativist interpretations of moral disagreement function in heterogeneous societies. I will also assess whether the evolutionary origins of metaethical attitudes undermine or support assumptions underlying evolutionary debunking arguments, particularly whether these attitudes were selected for cooperative advantages independently of their truth or accuracy.

Earlier versions of this research program received the Seal of Excellence in the Marie Skłodowska-Curie Postdoctoral Fellowship scheme and were shortlisted in the previous Ramón y Cajal call

Resumen del Currículum Vitae:

I am currently affiliated with the Department of Philosophy at the National University of Singapore, where I work on the Ethics and Evolution of Punishment project. Previously, I was a Research Associate in the Normativity Lab at the University of Konstanz. My academic background includes postdoctoral fellowships at the University of Bern (SNSF), the Konrad Lorenz Institute for Evolution and Cognition Research, and the Max Planck Institute for Evolutionary Anthropology, as well as a PhD at the Australian National University. Earlier, I was a Monbukagakusho scholar at the University of Tokyo.

My research integrates philosophy, psychology, and evolutionary theory. Within this interdisciplinary approach, I have developed complementary strands of philosophical analysis, cross-cultural experimentation, and computational modeling of normative cognition and cooperation. My publications include sole-authored and co-authored articles in internationally leading journals across philosophy, psychology, and evolutionary anthropology—such as *Synthese*, *The British Journal for the Philosophy of Science*, *Biology & Philosophy*, *Human Nature*, and the *Journal of Experimental Child Psychology*—which together have accrued 319 citations (Google Scholar). My article with Michael Tomasello in *Human Nature* received Springer Nature's Change the World One Article at a Time award, and my doctoral dissertation was nominated for ANU's J. G. Crawford Prize.

I maintain an active publication pipeline. I recently published an invited chapter in *New Essays on Normative Realism* (Oxford University Press), coauthored with Michael Tomasello, in which I draw out the philosophical implications of empirical research on normative cognition and cooperation. Current manuscripts under review include a formal model of the coevolution of moral beliefs and metaethical attitudes (*Biology & Philosophy*), a cross-cultural study on sociocultural distance and political orientation (*Journal of Experimental Social Psychology*), and a computational model of justificatory filtering in punishment (*The British Journal for the Philosophy of Science*). Since completing my PhD, I have secured over €750,000 in competitive funding through fellowships and research appointments supported by the Max Planck Society, DAAD (German Academic Exchange Service), the Konrad Lorenz Institute, the Swiss National Science Foundation, the University of Konstanz, and the National University of Singapore. Several of these projects involved independently designed research plans that later expanded into my current program.

My academic service includes membership on the Advisory Board of the Academic Philosophy Data and Analysis project. I also collaborate with research initiatives in Spain: I am a team member of the AEI-funded MetaProDes network and a team member of the Emergia-funded PrioriLab project, where I co-organize the Cultural Analytics and Digital Approaches in Philosophy seminar series.

I have extensive teaching and supervision experience across Colombia, Japan, Australia, Austria, Germany, Switzerland, and Singapore, covering philosophy, psychology, and interdisciplinary programs. My supervision includes undergraduate and master's research projects, serving as an external advisor for a PhD thesis at LMU Munich, and informal mentoring in cross-cultural and modeling-based research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: CAPRIOGLIO PANIZZA, SILVIA
Referencia: RYC2025-057083-I
Correo Electrónico: sil.panizza@gmail.com
Título: Ethics beyond deliberation / La ética más allá de la deliberación

Resumen de la Memoria:

The overarching topic of my research concerns the moral psychology of value beyond deliberation and choice – the traditional loci of morality. Fleshing out the hypothesis that value operates in ways that are unchosen and unconscious, yet for which we can still be morally responsible, I have developed two central research lines: on the ethics of attention and on moral impossibility. My account of the moral relevance of attention, developed in my monograph *The Ethics of Attention: Engaging the Real with Iris Murdoch and Simone Weil* (Routledge 2022), shows how evaluative perception and motivation are structured by attention, understood as a form of openness to reality. In my more recent research line on moral impossibility I argue that that value can play the role of excluder, by making possibilities unavailable for agents to conceive, take seriously, or act upon.

These ideas have generated fruitful applications in animal ethics, where I engage with the ways in which attentional failures sustain practices of instrumentalization and harm, and where I demonstrate how a shift in moral perception and conceptualisation of animals, enabled by attention, can lead to a change in moral possibilities available to agents, to the point that certain forms of animal harm become unconceived or unthinkable.

The next stage of my trajectory will advance a systematic theory of ethics beyond deliberation, centred on the examination of – the space of moral possibility. My aim is to uncover how value determines which possibilities are phenomenally available or unavailable, how social structures shape option-generation, and how agents can be responsible for these pre-deliberative configurations. Drawing on Murdoch, Williams, Frankfurt, and McDowell, and engaging recent work in conceptual ethics, this project seeks to reorient debates in moral psychology and meta-ethics by offering a unified model of how value operates in setting the stage upon which deliberation, choice, and action occur.

My research is defined by: (1) Excellence: through a field-defining monograph and publications in top Q1 journals; (2) Integrative approach: building bridges between analytic moral psychology, value theory, phenomenology, and applied ethics; (3) Systematic vision: a coherent programme showing how value shapes moral life beyond deliberation, with implications for both moral theory and applied ethics. (4) Commitment to impact: through sustained public engagement, interdisciplinary collaborations, and contributions to policy-relevant debates.

Resumen del Currículum Vitae:

I have developed an internationally-leading, rapidly expanding and innovative research agenda. In the last six years alone, I have published a trend-setting monograph, over 20 peer-reviewed articles and book chapters, 15 single-authored and 8 in Q1 journals, edited 3 volumes, and given 35 invited international talks, including 6 keynotes. I have established two path-breaking research lines – on the ethics of attention and on moral impossibility – while also expanding into applied domains such as animal ethics and the ethics of trust. Across these lines, I exercise clear scientific leadership: I have been awarded a Marie Skłodowska-Curie Individual Fellowship (MSCA), and led an international research team; I am Associate Editor at *The Journal of Ethics* and obtained the Italian Habilitation for Associate Professor in Moral Philosophy (2023). I also serve as referee for top journals and academic presses, including OUP, Ethics, Synthese, Erkenntnis, Philosophical Quarterly.

Earlier in my career I developed extensive pedagogical, managerial, and impact experience. I taught at 8 international institutions and assumed curriculum-level leadership. As Ethics Lecturer and Theme Leader at UEA (2016–19), I led School-wide course design and teaching teams; I became Fellow of the Higher Education Academy in 2019, and served on three ethics committees (NNUH, AWERB, House of Lords).

From 2019 my work became fully research-focused, first at the Centre for Ethics in Public Life at UCD, and later in the Horizon 2020 PERITIA project on trust and expertise. Since then, I have been Senior Researcher in two major projects (DFG and EU funded) and led two further projects as PI. Through my MSCA in 2022 I joined the EU-funded Centre for Ethics at the University of Pardubice (Czechia). In a short time, I have built a timely and influential research profile: I have become a leading expert in Iris Murdoch's philosophy and the ethics of attention – two themes of growing interest – as evidenced by keynote and invited talks. My monograph *The Ethics of Attention* (Routledge 2022) is the first book-length study of the ethical role of attention, and has generated nearly 100 citations. My recent research line on moral impossibility has already attracted a great deal of interest, resulting in two major international conferences (2022 and 2023), four papers in Q1 journals (including the *European Journal of Philosophy* and *The Journal of Ethics*), an edited collection (Routledge 2026), a large-scale outreach event (2023), and several invited talks, e.g. at Columbia University.

My expertise attracts international PhD students. I am currently primary supervisor of two students, and part of two international supervisory teams; I have also examined several PhD dissertations. I regularly share my research with the public through interviews (BBC, Canadian Radio), public articles (*The Conversation*, LSE Forum), and public events (e.g. at the Goethe Institut and as organiser of a public lecture series and a debate with J. Safran Foer).

I have active collaborations with researchers across Europe and the US: I have co-organised several international conferences, e.g. at Oxford in 2018, La Sapienza Rome in 2020, and Tübingen in 2025, and I am co-editing two special issues with academics from Tübingen and Bologna. I remain affiliated with both UCD and Tübingen.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: PEÑALBA RETES, MARKEL
Referencia: RYC2025-054192-I
Correo Electrónico: mpenalba@mondragon.edu
Título: Uncertainty-Aware Modelling and Risk-Informed Decision-Making Methodology for Offshore Renewable Energy and Green Hydrogen Technologies

Resumen de la Memoria:

Dr. Markel Penalba's research trajectory is defined by the development of integrated, uncertainty-aware methodologies for modelling, designing and operating offshore renewable energy (ORE) and green hydrogen systems. His work spans floating offshore wind, wave energy, floating PV and offshore hydrogen production, combining physics-based modelling, data analytics, experimental validation and risk-informed decision tools. Over recent years, he has consolidated a coherent scientific agenda structured into five complementary research lines, all oriented toward enabling climate-resilient, reliable and cost-effective offshore energy infrastructures.

1. Resource Characterisation under Climate Change: This line analyses how offshore wind, wave and solar resources evolve under climate change. It integrates bias-corrected reanalyses, long-term forecasting, synthetic time series and CMIP6 projections to generate probabilistic metocean data for design, operation and planning. The goal is to quantify climate-driven uncertainty and provide robust environmental inputs for downstream models.

2. Holistic Modelling, Control and Optimisation: Here, Dr. Penalba advances multi-physics simulation frameworks coupling hydrodynamics, aerodynamics, PTO dynamics, structural loading and control. These tools support the optimisation of performance, survivability and loads under realistic conditions. This line provides the core numerical foundation for evaluating design options and control strategies across offshore technologies.

3. Health-Aware Multi-Fidelity Modelling: This line focuses on degradation, failures and reliability. It integrates structural integrity models, corrosion-fatigue behaviour, data-driven fault detection and remaining useful life estimation. Through hybrid simulation and digital twin approaches, it enables predictive maintenance and more reliable operation of offshore assets.

4. Techno-Environomic Assessment: Complementing physical modelling, this line studies techno-economic, environmental and logistical aspects of floating wind and offshore hydrogen. It includes cost and O&M models, lifecycle assessment, hydrogen vector evaluation and whole-system optimisation. Its objective is to identify cost-optimal and environmentally sound development strategies.

5. Uncertainty and Risk Analysis:

This cross-cutting line provides the methodological basis for all others. It includes uncertainty quantification, Bayesian calibration, risk indices, robust optimisation and value-of-information methods. It integrates climate variability, model error, structural reliability and economic uncertainty into a coherent framework for risk-informed engineering and decision-making.

Across these five lines, Dr. Penalba has built a multidisciplinary programme connecting climate science, hydrodynamics, structural integrity, machine learning, digital twins, techno-economics and reliability engineering. His work has generated strong collaborations with PMEC-OSU, NREL, UCC, POLITO, DTU-Wind and Strathclyde, and has produced impactful open-source tools, datasets and methodologies.

Overall, his trajectory demonstrates clear scientific independence, the ability to define original research directions, and a strong capacity to generate advances that support the deployment of safer, more efficient and uncertainty-aware offshore renewable and green hydrogen technologies.

Resumen del Currículum Vitae:

Dr. Markel Penalba is an internationally recognised researcher in offshore renewable energies (ORE) and green hydrogen systems, specialising in uncertainty quantification, numerical-experimental hybrid modelling, digital twins, and techno-economic assessment. He completed an Industrial Engineering degree (2013), an Advanced Master in Marine Renewable Energies at ENSTA Bretagne (2014), and a PhD at the Centre for Ocean Energy Research, Maynooth University (2018). Early international stays in Germany, France and Ireland shaped his strong global research profile.

Since 2019, he has been Lecturer and Researcher at Mondragon Unibertsitatea, where he also holds an Ikerbasque Research Fellowship (2021-) in Offshore Technologies & Green Hydrogen. His scientific output is exceptional for his career stage: 73 indexed publications, more than 2,100 citations, an h-index of 24, and an average of 8.5 papers/year since 2020. His pioneering contributions include wave-to-wire modelling, climate-aware metocean characterisation, risk-based offshore design, floating-wind techno-economics, structural-integrity modelling and health-aware digital twins.

He has built an extensive international network with PMEC-Oregon State University, NREL, Sandia National Laboratories, University College Cork, Politecnico di Torino, DTU-Wind, Strathclyde University and COER, among others. He has participated in 36 research projects (over €3.29M managed), serving as Principal Investigator or Lead Investigator in more than half. He leads major projects such as OWC-Sim (US TEAMER), HYBRID (MCIN), farH₂gen (MCIN) and oceANNic (IKUR-HPC/AI), and is MGEP's lead in Horizon Europe projects INF4INiTY, COIN, EuropeWave, windTwin, as well as several ELKARTEK and HAZITEK industrial programmes.

Dr. Penalba has supervised 37 Bachelor and Master theses and currently (co-)supervises six PhD students, including two co-supervised with international universities and one with industry. One PhD was successfully defended in 2025, evidencing his strong commitment to high-quality training and mentorship.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

His leadership includes the development of widely used open-source software (FOWLTY, OWC-Sim, BC4ORE, ORE-Structural-Integrity) and open-access metocean repositories (LeoPARD). He has also registered two software tools, FLOWTEM® and OWCoptTool®, demonstrating significant applied impact and technology transfer.

He is Academic Editor of the Marine Energy Division of JMSE, reviewer of more than 90 scientific articles, evaluator in international R&D programmes, and a member of technical committees of EWTEC, ICOE, RENEW, SDEWES, WESC and WindEurope. He also sits on the Advisory Council of the Joint Research Laboratory on Offshore Renewable Energy (JRL-ORE).

In outreach, he participates in science fairs, media, and public debates on the energy transition. He is founder and director of Egutera, a pioneering citizen-owned solar cooperative, and board member of the Ekiola network of local energy communities.

Overall, his trajectory shows clear scientific independence, strong international leadership, and outstanding capacity to generate technological, scientific and societal impact in offshore renewable energies and green hydrogen.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: CAGIGAL GIL, LAURA
Referencia: RYC2025-055253-I
Correo Electrónico: lauracagigal@gmail.com
Título: Advancing Coastal Hazard Analysis under a Changing Climate through Hybrid Approaches and Climate-Based Emulators

Resumen de la Memoria:

Laura Cagigal Gil (LCG) is a postdoctoral research specialist at Arizona State University (ASU, USA), where she leads the scientific development of a NOAA-funded project on climate indicators and early-warning systems for Pacific Island nations. She is also a research affiliate at Scripps Institution of Oceanography and an external postdoctoral collaborator at the University of Cantabria (UC, Spain). Throughout her career, LCG has combined strong research mobility with solid scientific output: 32 Q1 publications (seven under review), participation in 17 competitive international projects, 15 conference presentations, seven invited seminars, and the co-supervision of four PhD and five master's theses. Her work has been recognized with the Juan de la Cierva Formación fellowship, the Fulbright-Castillejo mobility grant, and two awards from the University of Auckland.

Her trajectory has been shaped by research stays at leading international institutions, including a three-month Fulbright-Castillejo stay at Scripps Institution of Oceanography and a one-month visit to UNSW funded by the Diversity in Engineering Scheme. She has also carried out research visits at the Federal University of Santa Catarina (Brazil), Oregon State University, UC Santa Cruz and NCAR, and spent two months at the University of Hawai'i's East-West Center as part of a stakeholder-focused training program for Pacific Island communities. These stays strengthened her international network, expanded the application of her hybrid modelling tools and consolidated her leadership in coastal-hazard research.

LCG's trajectory is structured around several research lines (RLs) she has developed with increasing independence. Her PhD laid the foundations for climate-based wave emulators for shoreline evolution (RL2.1), followed by methods to emulate multimodal directional spectra for island flooding (RL2.2) and empirical frameworks for tropical-cyclone-generated waves (RL2.3). She later led major advances in hybrid downscaling, co-developing HyWaves and generalizing it into BinWaves (RL2.4), now used globally and operationally by Pacific Island meteorological services. She played a central role in the World Bank impact-forecasting system for Samoa and Tonga, developing hybrid methods and delivering in-country training in Fiji, Samoa and Tonga (RL2.5). Her work also includes hybrid approaches for nearshore wave transformation under variable bathymetry (RL2.6) and probabilistic assessments of long-term coastal hazards (RL2.7). Across all lines, she has consistently promoted open, reproducible science through BlueMath, now used by more than 20 institutions.

In her future research line, LCG aims to consolidate a framework linking climate variability, wave dynamics, shoreline evolution and coastal flooding through efficient hybrid models and climate emulators. Her goal is to bridge the gap between hydrodynamic and morphodynamic modelling by explicitly incorporating the influence of shoreline position and beach-profile geometry for coastal flooding, moving beyond static-shoreline assumptions. The first step is HyShore, a hybrid shoreline-evolution model driven by spectral wave characteristics and large-scale climate patterns, later forced with synthetic series generated by climate emulators to explore long-term erosion trajectories, storm clustering and compounding impacts.

Resumen del Currículum Vitae:

Laura Cagigal Gil (LCG) is a postdoctoral research specialist at Arizona State University (ASU, US), where she leads the scientific development of a NOAA-funded project on climate indicators and early-warning systems for Pacific Island nations. She is also a research affiliate at Scripps Institution of Oceanography (California) and an external postdoctoral collaborator at Universidad de Cantabria (UC, Spain). LCG holds a PhD in Environmental Science from the University of Auckland (2021), a Civil Engineering degree and a Master in Coasts and Ports Engineering (UC). Her scientific production includes 32 Q1 journal articles, seven manuscripts under review and participation in 17 national and international research projects. She has presented at 15 international conferences, delivered seven invited seminars, chaired sessions at ICCE 2022 and 2024 and Coastal Dynamics 2025, and co-chaired the 2025 International Workshop on Waves, Storm Surges and Coastal Hazards, coordinating more than 250 participants. She regularly reviews for high-impact journals, has co-supervised four PhD theses and five master's theses, and has contributed to teaching through master-level courses and international training workshops. Her awards include the UoA Dean's List distinction, the Postgraduate Student Project Award, the Juan de la Cierva Formación fellowship and a Fulbright-Castillejo mobility grant.

During her postdoctoral stage at UC and later as a Juan de la Cierva fellow, LCG played a leading role in the World Bank's impact-forecasting system for Samoa and Tonga. She developed hybrid modelling tools (SHyTCWaves, HyBeat, GreenSurge) and led the development and dissemination of BinWaves, a downscaling framework now used operationally across Pacific meteorological services. Her career has been strongly international, with research stays at UNSW (Australia), the Federal University of Santa Catarina (Brazil), Scripps Institution of Oceanography (Fulbright-funded), Oregon State University, UC Santa Cruz, NCAR and the University of Hawai'i. These visits broadened her work toward shoreline evolution, tropical-cyclone impacts, nearshore hybrid modelling and climate-driven coastal hazards, while strengthening collaborations with NOAA, OSU, UCSC, UNAM, NIWA, CSIRO and other institutions.

Since 2025, at ASU, she coordinates the Pacific Harmonization Committee, an international consortium engaging institutions from the US, Australia, New Zealand and Pacific Island agencies to establish shared coding standards, reproducible workflows and open-source climate tools. She also leads stakeholder-focused training workshops in Palau and the Marshall Islands, improving the operational uptake of climate services in highly vulnerable regions.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

A strong advocate of open science, LCG is a leading developer of BlueMath, an international open-source repository for statistical analysis and fast hybrid modelling of coastal hazards. She has delivered numerous training sessions across Europe, Asia and the Pacific, helping build a global community of practice. More broadly, her work aims to advance coastal-hazard prediction through accessible modelling tools, strong international collaborations and reproducible scientific workflows, contributing to improved coastal-risk assessments and climate-adaptation capabilities.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: OANCEA, CRISTINA
Referencia: RYC2025-055350-I
Correo Electrónico: oanceacristina90@yahoo.com
Título: 4D Dose and LET Dosimetry System for Motion-Robust Proton Therapy

Resumen de la Memoria:

A lo largo de la última década he desarrollado un programa de investigación en la intersección entre la física de detectores, la física médica y la oncología radioterápica. El proyecto que propongo aborda una cuestión central en la protonterapia moderna: cómo verificar, con relevancia física y biológica, que los tumores en movimiento reciben la dosis y el linear energy transfer (LET) previstos en la planificación.

Desde la finalización de mi doctorado (2018), mi actividad investigadora ha evolucionado en tres líneas convergentes.

(1) Caracterización de campos radiológicos a nivel de partícula mediante detectores Timepix. He desarrollado métodos de espectro-tracking capaces de reconstruir trayectorias individuales, energías y LET a partir de señales agrupadas en detectores híbridos de píxeles. Validadas en más de veinte instalaciones internacionales y >500 horas de haz, estas metodologías han revelado composiciones de campo mixto, distribuciones de dosis fuera de campo y espectros LET alrededor de implantes, no accesibles mediante la dosimetría convencional. Hoy constituyen una referencia para varios grupos que trabajan en verificación sensible al LET.

(2) Instrumentación para haces de dosis ultra-alta (FLASH). Como WP leader/PI en el proyecto EMPIR UHdpulse diseñé módulos Timepix3 para su uso en fantasmas de agua y establecí la caracterización a escala de microsegundo de haces FLASH mediante mediciones fuera del campo. Este trabajo proporciona medidas pulso a pulso de dosis y tasa de dosis, así como modelos de incertidumbre, conectando prototipos de laboratorio con condiciones clínicas realistas.

(3) Ecosistemas de software para verificación basada en detectores. En el marco de proyectos de la ESA he contribuido al desarrollo de TraX Engine, creando cadenas de análisis modulares para monitorización de haces FLASH, identificación de partículas y cálculo de LET. Actualmente, TraX Engine se utiliza en régimen de demostración por más de veinte grupos, ilustrando la traducción de la física de detectores a herramientas operativas de QA.

En el programa Ramón y Cajal en CiMUS-USC consolidaré estas tres líneas en un proyecto coherente, 4D Dosimetry, orientado a la verificación cuatridimensional (x,y,z,t) de dosis y LET en pencil-beam scanning, así como a la comisión y caracterización de FLASH y proton minibeam radiotherapy. En colaboración con el Proton Therapy Center de Galicia desarrollaré: (i) calibración metrológica con incertidumbre combinada <0.5 % en dosis y LET; (ii) reconstrucción por fases y validación en fantasmas torácicos móviles; (iii) protocolos de commissioning y QA para pMBRT y FLASH; y (iv) software interoperable que facilite su adopción dentro de la red española de protonterapia.

Las variaciones de LET inducidas por el movimiento, actualmente no cuantificadas, pueden alcanzar niveles que impactan la toxicidad y limitan la escalada de dosis. Al hacerlas medibles en escenarios clínicamente realistas, este programa permitirá una verificación biológicamente informada y estrategias terapéuticas más seguras y eficaces. Mi visión a largo plazo es situar a USC-CiMUS y PTC-Galicia como un nodo europeo de referencia en verificación basada en detectores y generar la evidencia necesaria para una futura optimización guiada por LET.

Resumen del Currículum Vitae:

Soy investigadora senior en física médica con un perfil que integra instrumentación, dosimetría y traslación clínica. Obtuve el doctorado en 2018 (summa cum laude) mediante un proyecto codirigido entre Rumanía, Rusia y Chequia sobre perturbaciones inducidas por implantes en radioterapia. Durante este periodo obtuve tres becas competitivas (>60 k€) y diversos proyectos menores (>50 k€) que financiaron mis propios experimentos, lo que supuso un indicador temprano de independencia científica.

Desde 2018 desarrollo mi actividad en ADVACAM (Praga), empresa derivada de la colaboración Medipix del CERN y del Instituto de Física Experimental. Me desvinculé deliberadamente de los grupos de mis directores de tesis y consolidé una línea independiente de verificación para protonterapia basada en detectores Timepix. En siete años he progresado de postdoctorado a Investigadora Senior y he liderado o co-liderado proyectos con presupuestos superiores a 1 M€, incluyendo un programa FWO de radioterapia FLASH robótica, el proyecto EMPIR UHdpulse (metrología para UHDR), contratos tecnológicos de la ESA (MIRAM, DPE) y contribuciones a un NIH R01 en micro-CT de contraste de fase. He coordinado >500 horas de haz en OncoRay Dresden, MedAustron, CCB Kraków, PTC Prague, Northwestern Medicine Chicago, HIMAC y otras instalaciones.

Mi producción científica incluye 49 artículos revisados por pares (h-index 15, >500 citas), con 19 como primera, correspondiente o senior author en revistas Q1 como Physics in Medicine & Biology, Physica Medica y Medical Physics. Entre mis contribuciones destacan: métodos de LET de amplio rango para partículas primarias y secundarias, estudios cuantitativos de perturbaciones por implantes, dosimetría de campos mixtos y neutrones en protonterapia, y caracterización pulso a pulso de haces FLASH. Soy responsable científica del software TraX Engine, utilizado por más de 20 grupos mediante licencias de demostración, e inventora en una solicitud de patente sobre verificación LET. También he contribuido a la implementación del sistema Timepix de monitorización en tiempo real en el Proton Therapy Center Czech y a la creación de conjuntos de datos FAIR de acceso abierto.

Estoy comprometida con la formación y la evaluación. He co-supervisado una tesis doctoral (defensa en 2025) que dio lugar a un artículo Q1 donde figuro como autora senior, y he tutelado estudiantes de máster y doctorado de distintas instituciones. Reviso regularmente para Physics in Medicine & Biology, Radiation Measurements y otras revistas (IOP Trusted Reviewer), y he actuado como session chair en PTCOG. Mi visibilidad incluye en invitaciones a CERN-Medipix, PTCOG, FRPT, así como en un Best Poster Award (ICTP 2024) y becas de viaje PTCOG/IEEE.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Mi trayectoria se ha desarrollado en paralelo a dos permisos de maternidad de larga duración (entre 2020 y 2025). Durante estos periodos mantuve actividad científica a tiempo parcial, continué publicando y ejercí liderazgo en proyectos internacionales. Mi pareja y mis dos hijas son de nacionalidad española, y estamos en proceso de traslado definitivo a Galicia. La obtención de un contrato Ramón y Cajal me permitirá consolidar mi carrera en España, establecer en CiMUS@USC un grupo de investigación especializado en verificación 4D de dosis y LET y contribuir de forma sostenida al desarrollo de la protonterapia en Galicia y en España.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: GONZALEZ FLO, EVA

Referencia: RYC2025-054913-I

Correo Electrónico: evagonzalezflo@gmail.com

Título: Bioengineering Principles for Environmental Applications

Resumen de la Memoria:

Dr. Eva Gonzalez-Flo holds a PhD in BioEngineering from Pompeu Fabra University (2020), graduating with Excellent Cum Laude. Her research focuses on applying engineering principles and mathematical modeling to biological processes with significant social impact, particularly in the environmental and biomedical fields. Dr. Gonzalez-Flo has contributed to the development of genetic tools for creating multicellular biosensors and optimizing microbial systems, with applications in health and environmental monitoring. During her doctoral studies, she specialized in synthetic biology, publishing 4 first-quartile articles based on her thesis, and conducted research stays at Cambridge University.

Her postdoctoral research at the Polytechnic University of Catalonia has expanded into environmental biotechnology, focusing on optimizing cyanobacteria for sustainable bioplastic production, exo-polysaccharides, and pigments for materials and food industries. In GEMMA-UPCA she established a new research line on the genetic and molecular optimization of cyanobacteria cultures, collaborating internationally at Tübingen University and Universidade Nova de Lisboa to advanced innovative bioproduct strategies. Throughout her postdoctoral experience, Dr. Gonzalez-Flo is expanding her knowledge in areas like the industrialization and valorization of bio-inspired products for environmental, food, and biomedical purposes. Allowing a better understand of industry needs, reflecting these aspects in her research line. She has published 20 papers in this field, supervised 1 PhD and co-supervises 2 others, filed a patent, and collaborated with industry to validate technologies at pilot and industrial scales, potentially reducing production costs by up to 30% and supporting the circular bioeconomy and low-carbon bioplastic production.

Dra. Gonzalez-Flo envisions pioneering a research direction focused on crafting tailored biopolymers designed for specific tissue applications, harnessing the unique attributes of bioplastics. Through a meticulous exploration of how photosynthetic microbial consortia produce biopolymers, coupled with the application of environmental engineering and synthetic biology principles, she aims to unravel the core processes within natural microbiomes. This endeavour aims to establish an integrated systems biology approach, paving the way for the precision engineering of highly customized bioplastics.

Resumen del Currículum Vitae:

Dr. Eva Gonzalez-Flo earned her PhD in BioEngineering from Pompeu Fabra University (UPF) in 2020, graduating with Excellent Cum Laude. Her academic journey began with a top-three ranking in her undergraduate Biomedical Engineering degree (2015), followed by a master's in Biomedical Research (2016), where she received honors for her thesis on multicellular sensors. During her doctoral studies, funded by a Generalitat de Catalunya fellowship, she contributed to synthetic biology research, publishing 4 first-quartile articles and engaging in international collaborations at Cambridge University. She supervised the UPF-CRG group in the iGEM competition at the Massachusetts Institute of Technology (MIT), being invited as a judge in the 2020 edition. Throughout the doctoral thesis she taught classes in the UPF biomedical engineering degree, where she prepared several new and innovative teaching materials. She has coordinated the synthetic biology courses at the UPF junior campus during three editions and has participated in a teaching innovation project that was awarded in the Teaching Quality Awards of the Social Council of the UPF.

In 2021 Dr. Gonzalez-Flo joined the Universitat Politècnica de Catalunya (UPC) as a postdoctoral researcher, leading the scientific coordination of the Interreg-POCTEFA FERTILWASTES project on the valorization of co-products originating from waste treatment under a circular economy approach. She led a scientific team of 7 researchers, organized workshops, coordinated results dissemination and produced a video film.

In 2022, she was awarded a competitive Margarita Salas postdoctoral fellowship, enabling her to continue her research at UPF and undertake a postdoctoral stay with the Group of Environmental Engineering and Microbiology. During this time, she joined the HORIZON 2020 PROMICON and AEI-Cyan2Bio projects, where she led experimental efforts focused on developing genetic techniques to optimize cyanobacteria cultures for biopolymer production. Additionally, she coordinated the Interreg-SUDOE TARGET project, designing cellular and molecular tools to monitor water quality.

Following the completion of the Margarita Salas fellowship (2024), she joined Professor Forchhammer's research group at Tübingen University, Germany. She conducted experiments on innovative strategies for bioplastic production using microbiomes and co-supervised a doctoral student. Additionally, as part of the PROMICON project (2024-2025), she carried out part of her research activity at NOVA University Lisbon (Portugal), where she strengthened collaborations with the NOVAiD (Profs. Maria Reis and Cristiana Torres) team and advanced joint experimental workflows for EPS production with photosynthetic microbiomes.

Currently, Dra. Gonzalez-Flo is part of the Environmental Technologies teaching team at the Barcelona School of Civil Engineering, teaching the Environmental Engineering degree in subjects related to environmental biotechnology, and in the Biomedical Engineering Degree at the Barcelona East School of Engineering (14,5 ECTS).

Dr. Gonzalez-Flo has authored 24 scientific articles and 2 policy briefs, including 9 as a corresponding author and 7 as a first author. She has accumulated 390 hours of teaching. Additionally, she has supervised 25 undergraduate and master's students, completed 1 PhD, and co-supervising 3 PhD candidates.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: GRUSSU, FRANCESCO
Referencia: RYC2025-054665-I
Correo Electrónico: francegrussu@gmail.com
Título: Advancing Magnetic Resonance image computing to enhance precision medicine
Resumen de la Memoria:

I am a biomedical engineer specialised in Magnetic Resonance Imaging (MRI), Senior Investigator at the Vall d'Hebron Institute of Oncology (VHIO). My career has focussed on engineering innovative MR technologies for precision medicine, with applications in neurology and oncology. My mission is to improve the detection and characterisation of diseases via new, affordable MR scans and scalable image processing and Artificial Intelligence (AI), thereby advancing the management of patients and enhancing their clinical outcomes.

I currently lead an independent research line at VHIO, focussed on (i) developing "virtual MRI biopsies" that decipher the biological characteristics of tumours non-invasively, and (ii) using AI to enable the virtual biopsies on short, clinically feasible MRI scans. Through these synergistic approaches, I translate innovation into new practices that benefit patients.

The impact of my science is demonstrated by a h-index of 25 and 2445 citations as of 08/12/2025 (Google Scholar). 361 citations alone come from my most cited article (Grussu et al, Ann. Clin. Transl. Neurol. 2017). The study showed that MRI can measure pathological alterations in neural fibre architecture associated with multiple sclerosis, validating the finding through histology. This previously undescribed layer of pathology has actionable prognostic relevance.

My strategy consists of leveraging MR physics, computer science and AI to deliver new imaging biomarkers that enhance patient care. My productivity and independence are reflected by 63 publications (12 first-author articles, 5 last-author articles; of these, I am corresponding author of 12). My articles have been published in specialised channels of the MR physics community (Magn. Res. Med.), but also in generalist journals with a wider reach (Commun. Med.).

Aware of the importance of maximising the impact of my work and bridging disciplines, I am committed to scientific outreach. I regularly participate in dissemination events, and I routinely release my code and data (2 data sets; 11 code repositories).

I obtained my PhD at University College London (UK) in 2016 and moved to VHIO in 2020, kicking off my personal research theme on virtual MRI biopsies. The foundational article underscoring my approach has been published recently in the most respected medical image computing journal (Voronova et al, Medical Image Analysis 2025). This study has consolidated my position as a global leader in cancer MRI, a fact also proven by the invitation to convey 14 lectures at international venues (e.g., ISMRM Diffusion MRI workshop, Kyoto, 2025), and by prestigious awards ("MR of Cancer" Study Group prize, ISMRM 2021).

My leadership is demonstrated by the successful attraction of over €500,000 (including a grant by the Agencia Estatal de Investigación and a "la Caixa" fellowship), and the official supervision of six Master's students and three PhD researchers (theses ongoing, University of Barcelona).

As a RYC fellow, I aim to consolidate and expand dramatically my research line in MRI virtual biopsies, boosting its applicability and deploying in real-world cancer settings. I will generalise the framework to clinically-acquired computed tomography (CT) and, for the first time, integrate the virtual biopsies with diverse clinical data (e.g., genomics, histopathology) through AI information fusion.

Resumen del Currículum Vitae:

I am a scientist specialised in technical Magnetic Resonance Imaging (MRI) research and development.

I trained in engineering in Italy (BEng Biomedical Engineering, University of Cagliari 2009; MEng Bioengineering, University of Genoa 2012), and I hold a PhD in MR physics from University College London (UCL, UK; 2016). I have completed my post-doctoral training at UCL, where I was research associate from 2016 to 2020, and at the Vall d'Hebron Institute of Oncology (VHIO) of Barcelona, where I worked as senior post-doctoral fellow from 2020 to 2024. From January 2025, I am Senior Investigator at VHIO, leading a personal research line in computational MR imaging (MRI) in oncological applications.

My publications feature articles in specialised channels of the MR physics and medical image computing community, such as Magnetic Resonance in Medicine and Medical Image Analysis, but also journals with a broader reach, as for example Communications Biology or Cell Reports Medicine. I have published 63 among articles, reviews and conference papers. Of these, in 12 I was first or co-first author; in 5 I was last author; and in 12 cases I was corresponding author. Among my most relevant contributions, notable examples are: Grussu et al, NeuroImage 2015, 111: 590-601 (169 citations); Grussu et al, Annals of Clinical and Translational Neurology 2017, 4(9): 663-679 (361 citations); Voronova et al and Grussu, Medical Image Analysis 2025, 102: 103531 (3 citations); Grigoriou et al and Grussu, Communications Biology 2025, 8: 1695 (783 accesses in the first 12 days following publication). My impact statistics are: Google Scholar h-index 25; 2448 citations as of 08/12/2025.

My scientific work in cancer MRI has gained international recognition, establishing me as a global leader in the field. My invitations to speak include major international venues such as the 2025 International Society for Magnetic Resonance in Medicine (ISMRM) Diffusion MRI workshop in Kyoto. Furthermore, my conference abstracts have been recognised with prestigious awards, notably the 2021 "MR of Cancer" Study Group prize at ISMRM.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My global leadership is demonstrated by my election as "young scientist" (trainee) representative of the White Matter Study Group of the ISMRM in 2018 (a competitive post open at world-wide level), and by the leading role that I took in the organisation of 7 scientific events. These include the 2017 and 2018 "Computational Diffusion MRI" workshops and challenges at the Medical Image Computing and Computer-Assisted Intervention (MICCAI) conference.

My leadership as an independent scientist at VHIO is demonstrated by a solid network of international collaborators, which include Cardiff and New York University (see Grigoriou et al, Commun Biol 2025), and by the successful attraction of over €500,000 in competitive funding. Among the awarded grants are a prestigious "la Caixa" Junior Leader fellowship in 2022, and a State Research Agency (AEI) "Generacion de Conocimiento" grant in 2025. My academic independence is demonstrated by my extensive experience in student supervision: I have so far supervised officially six Master's students (4 at UCL, 2 at VHIO, one from the Delft University of Technology in the Netherlands), and I am official thesis director of 3 PhD candidates (University of Barcelona).



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: ZUO, YIBING
Referencia: RYC2025-055162-I
Correo Electrónico: yibing.zuo@ietcc.csic.es
Título: Low-carbon, Sustainable, Durable and Safe Alkali-Activated Materials

Resumen de la Memoria:

My research career has been shaped by strong international and disciplinary mobility, spanning China, the Netherlands, and Spain, and by a progressive evolution of scientific focus from Portland-cement hydration to advanced modelling and sustainable, waste-derived alkali-activated materials (AAMs). These diverse experiences enabled me to develop a uniquely integrative research profile combining experimental chemistry, multi-scale modelling, durability science, and digital innovation.

(1) Early trajectory: Portland-cement hydration, microstructure evolution and shrinkage (2011–2014)

During my Master's research at HUST, I focused on hydration kinetics, microstructural development and shrinkage behavior of Portland-cement systems. I demonstrated, for the first time, quantitative relationships among resistivity evolution, chemical shrinkage and autogenous shrinkage, introducing a parameter to distinguish self-desiccation effects. This work provided me first experience in bridging physical measurements with mechanistic numerical interpretation. It also marked the beginning of my long-term interest in coupled chemo-physical processes in cementitious binders.

(2) PhD trajectory: Modelling and simulation of AAMs (2014–2019)

At TU Delft, I expanded my scope to AAMs, addressing fundamental knowledge gaps in reaction kinetics, dissolution mechanisms and microstructure evolution. I developed GeoMicro3D, the first numerical model that is able to mechanistically simulate dissolution–reaction–microstructure coupling in AAMs. This model opened a new research direction at Microlab (TU Delft), inspired subsequent PhD projects, and generated high-impact outputs. My PhD consolidated my experimental and modelling expertise and established my independence in defining novel mechanistic modelling frameworks.

(3) Lecturer and independent PI trajectory: Durability, waste valorization and multi-physics modelling (2019–2025)

As a lecturer in China, I built new and independent research lines focusing on the durability of AAMs, the valorization of industrial wastes, and the modelling of sulfate attack, chloride solidification, and size effects in geopolymer concrete. I secured six competitive projects as sole PI, supervised students, and strengthened my modelling expertise by developing new thermodynamic models. Parallely, I initiated significant international collaborations and contributed to standards, patents, and conference organization, expanding my leadership and scientific visibility.

(4) Current MSCA Fellow trajectory: Environmental safety and heavy-metal immobilization (2025–)

As a MSCA Postdoctoral Fellow at CSIC, I advanced into the sustainable and environmental domains of AAMs, focusing on heavy-metal immobilization. This work broadens my expertise toward risk assessment, reactive transport, and durability-related degradation, reinforcing my ability to integrate environmental engineering with binder chemistry and numerical modelling.

Across these stages, I have built a coherent research trajectory grounded in hydration science, microstructure evolution, coupled chemo-physics processes, durability modelling, and sustainable waste valorization. My interdisciplinary expertise, modelling capabilities, and emerging leadership in research position me to successfully establish a distinct, innovative and high-impact research line in Spain under the RyC program.

Resumen del Currículum Vitae:

I am a Marie Skłodowska-Curie Postdoctoral Fellow at CSIC and an emerging international leader in sustainable cementitious materials, alkali-activated materials (AAMs), and industrial waste valorization. My career—spanning China, the Netherlands, and Spain—combines advanced experimentation, multi-scale characterization, thermodynamic modelling, and high-fidelity numerical simulation to address urgent global challenges in decarbonization, environmental safety, and circular economy. I obtained my PhD from TU Delft (2019), where I developed GeoMicro3D, the first model capable of simulating dissolution–reaction–microstructure coupling in AAMs. This breakthrough opened an entirely new digital research direction and established the scientific foundation upon which I continue to build. Since then, I have consolidated my independence through 40+ journal papers, >1800 citations (h-index 20), 2 book chapters, and a track record of €385k in total in competitive funding as PI, including the prestigious MSCA-PF. My work integrates mechanistic understanding with predictive modelling, spanning hydration kinetics, reactive transport, heavy-metal immobilization, and performance-based mixture design—each directly aligned with EU and Spanish priorities in low-carbon construction, waste recycling, and environmental protection. I demonstrate strong international visibility through 25+ oral/invited conference presentations and scientific leadership within RILEM, where I contribute to multiple Technical Committees and am leading the creation of a new TC on heavy-metal immobilization in AAMs, supported by more than 30 global experts. I have also built a powerful international network of 50+ collaborators from 20+ institutions, including world-leading researchers such as John Provis, Guang Ye and Caijun Shi, enabling highly interdisciplinary, high-impact research lines.

My work has tangible industrial and societal impact. I collaborate closely with companies on waste valorization, environmental safety, and durability of sustainable concretes. I participated in developing standards and developed an invention patent on phosphogypsum valorization that will enter industrial exploitation. These outputs demonstrate my ability to translate deep scientific advances into practical, regulatory, and economic benefits.

I have a strong commitment to mentoring, having supervised 17 students, co-supervised a PhD researcher, and earned awards for excellence in teaching and mentoring. My interdisciplinary training experience and international mobility—from China to the Netherlands and Spain—further reflect my adaptability, scientific maturity, and ability to thrive in diverse research environments.

Together, these achievements demonstrate a unique combination of mechanistic insight, modelling innovation, leadership, and translational impact. The proposed Ramón y Cajal research line on Durability–Leaching Coupling in Waste-Derived Alkali-Activated Materials is a bold, forward-looking program that will establish predictive tools, mechanistic foundations, and phase-engineered control strategies essential for safe and durable circular-economy construction materials. This work has the potential to position Spain as a European reference in sustainable cement science, environmental safety, and next-generation materials research.



MINISTERIO
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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: PICARDI, GIACOMO

Referencia: RYC2025-055672-I

Correo Electrónico: giacomo.picardi1991@gmail.com

Título: Bioinspired field robotics

Resumen de la Memoria:

My scientific trajectory is structured around the research line “Bioinspired Field Robotics”, which integrates my background in robotics, control, and bioinspired design with growing expertise in marine field operations, marine ecology, precision agriculture, and space exploration. My overarching goal is to develop robotic systems capable of reliable performance in extreme and dynamic environments, where inspiration from biological organisms provides principles of locomotion, manipulation, perception, and adaptation that surpass the limitations of conventional designs.

This research line is articulated into two synergistic pillars. The first focuses on bioinspiration and biomimetics, aiming to demonstrate quantitative improvements beyond the state of the art in locomotion, physical interaction, and adaptive behaviour. This sub-line combines biomechanical and environmental modelling, high-fidelity simulation, and the development of low-TRL prototypes, with the progressive incorporation of machine learning and AI for system analysis, state estimation, navigation, and control. Close collaborations with marine biologists and ecologists are central to identifying novel biological models, defining experimental protocols with living organisms, and accessing specialised research infrastructures. These efforts have led to innovations such as morphologically induced stability, deformable-body locomotion, and adaptive manipulation strategies.

The second pillar focuses on field robotics, targeting the development of advanced robotic platforms and control strategies for real operational scenarios. This includes custom-built systems—most notably the underwater legged robots I have pioneered internationally—as well as adapted commercial vehicles for ecological monitoring, sampling, and restoration. This sub-line addresses higher-TRL development and benefits from strong collaborations with technology developers and end-users. My involvement in applied research projects such as DIGI4ECO, SUN-BIO, MERLIN, and AI4SEA, where I lead tasks and a Work Package, provides concrete application cases, end-user requirements, insights from policymakers, and extensive opportunities for field deployments. Recent examples include sediment sampling for microplastic assessment, soft-coral habitat monitoring, benthic crawler missions, and the development of an under-ice AUV for Arctic ecosystem restoration.

A defining strength of my trajectory is the interplay between fundamental bioinspired research and high-TRL field robotics. Insights from low-TRL studies—such as embodied intelligence, compliant mechanisms, and biologically grounded control principles—are systematically transferred to operational platforms, accelerating innovation and increasing real-world impact. To support this translational approach, I have developed open tools including three simulators for underwater legged robots and the Open Toolkit for Underwater Field Robotics, which facilitate reproducibility and community adoption.

Through this dual and interconnected strategy, my research line aims to strengthen the scientific foundations of bioinspired robotics while delivering tangible technological advances for marine sciences, sustainable blue-economy applications, agriculture, and space exploration.

Resumen del Currículum Vitae:

My research focuses on bioinspired and field robotics, aiming at understanding how compliant structures, embodiment, and mechanical intelligence enable locomotion, manipulation, and autonomy in unstructured environments. My contributions span soft robotics, legged locomotion, manipulation, and underwater robotics. Early in my career, I advanced the foundations of soft robot locomotion and demonstrated how deformable bodies can enhance stability and adaptability. Building on this, I became one of the main proponents worldwide of Underwater Legged Robotics, introducing a new class of marine robots capable of low-disturbance seabed interaction, precise sampling, and robust mobility. I developed several prototypes—including SILVER2, which enabled >10 scientific outputs—and contributed methods that link morphology, control, and environmental interactions. This trajectory led to interdisciplinary advances bridging robotics with marine ecology, agriculture, and space exploration. I openly released three simulators and the Open Toolkit for Underwater Field Robotics, now used for collaboration, training, and autonomy research.

I have progressively taken on scientific leadership. At ICM-CSIC, I established a new research line through two competitive fellowships and I currently lead tasks and a Work Package across four European and national projects. I have contributed to >10 EU and national research projects, acted as technical manager and coordinator contact in SoftGrip, and participated in three industrial contracts on aquaculture and restoration. My international network includes long stays and collaborations with NASA-JPL, UPC-SARTI, University of Gothenburg, TEAGASC, and Ocean Networks Canada, resulting in several co-authored works with colleagues from over 17 countries. I have been invited to speak at leading institutions and I regularly contribute to international workshops, scientific committees, and proposal evaluations.

My work has significant societal impact. I co-develop robotic solutions with end-users in marine ecology, aquaculture, and climate restoration, including sediment sampling for microplastics, soft-coral monitoring, and Arctic ecosystem restoration. Collaborations with industrial and academic end-users have enabled real deployments and informed environmental monitoring strategies. My research has been disseminated at high-level policy events such as the UN Ocean Decade Conference and has gained broad media visibility. I actively engage with citizens through school outreach, public festivals, mass media.

I am committed to mentoring and community-building. I have supervised five Bachelor theses, five Master theses, and one ongoing PhD project, and I have mentored numerous MSc and PhD students whose work led to indexed publications. I attract international students and co-supervise theses across Europe and Asia. I teach in MSc programs, seasonal schools, and professional courses, and I have organised international workshops and summer schools connecting robotics and marine sciences. I serve as Associate Editor for ICRA, Topic Editor for two journal collections, reviewer for major journals, and evaluator for the Schmidt Ocean Institute.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

My contributions also extend to open science: most of my publications are accessible through open channels, and I maintain open-source software, and hardware repos aligned with FAIR principles.



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: MONTANINO MONTANINO, ANDREA

Referencia: RYC2025-056132-I

Correo Electrónico: andrea.montanino1987@gmail.com

Título: Memoria_unico_RYC2025_Montanino

Resumen de la Memoria:

I was born in 1987 in Salerno, Italy. I completed my Bachelor's (2009) and Master's (2011) degrees in Mechanical Engineering and obtained a PhD in Computational Mechanics and Advanced Materials at IUSS, Pavia, in January 2016. My doctoral research focused on developing a novel meshless method for elasticity and fluid dynamics, culminating in a thesis entitled "Modified Finite Particle Methods in the Context of Meshless Methods," recognized as the best PhD thesis in Computational Mechanics of Fluids by the Italian Group of Computational Mechanics (GIMC) in 2017.

After my PhD, I joined the Polytechnic University of Milan as a postdoctoral fellow with Prof. Anna Pandolfi, applying computational mechanics to biomechanical problems. I focused on fluid-structure interaction between the human cornea and the aqueous humor, developing numerical models that coupled a Lagrangian particle method for the fluid with Finite Elements for the corneal tissue. These models enabled simulation of in-vivo and ex-vivo medical tests and corneal surgery, supporting the estimation of tissue mechanical properties. This work, developed in collaboration with industry, contributed to methodologies for the informed design of surgical procedures.

From July 2019 to July 2024, I served as Assistant Professor of Mechanics of Solids and Structures at the University of Naples "Federico II" and collaborated with the PLINIVS Center, focused on natural risk assessment and mitigation. My research addressed computational modeling of pyroclastic density currents and coastal flooding. Pyroclastic flows, modeled as compressible gas-solid mixtures impacting structures at high temperatures and pressures, posed numerical challenges, which I addressed using the Variational Multiscale method to stabilize multiphase flows. Coastal flooding simulations coupled Lagrangian PFEM with Eulerian shallow water models to manage large domains. This research was funded by the Italian PRIN program, where I was Principal Investigator, and supported by the Severo-Ochoa mobility program, including multiple research periods at CIMNE.

In parallel, I conducted research on masonry structures, developing the Continuous Airy-based method for Stress Singularities (CASS), optimizing the Total Complementary Energy for no-tension materials. This method was applied to vaults, domes, panels, and real case studies, funded by national and European projects such as VIRA and H2020 ISTOS.

From September 2024 to September 2025, I was Innovation Leader at CIMNE, working with the biomedical group on fluid-structure interaction in the descending aorta to evaluate mechanical properties of biological tissues, in a public-private collaboration with AORTYX (Barcelona).

I have extensive teaching experience, as course holder of Mechanics of Solids and Structures (University of Naples, 2019-2024) and tutor for Mathematical Analysis, Fundamentals of Computational Mechanics, and Mechanics of Solids and Structures (University of Pavia, Polytechnic University of Milan, 2012-2019). I co-supervised five master's and four PhD theses in Italy and Spain and was invited lecturer at an international summer school on Historic Masonry Structures for five consecutive years (2021-2025).

In January 2025, I won a public competition for Associate Professor at Pegaso University, with the contract starting in February 2026.

Resumen del Currículum Vitae:

Personal Information

Born: 1987, Salerno, Italy

Education

PhD in Computational Mechanics and Advanced Materials, IUSS Pavia, 2016

Thesis: "Modified Finite Particle Methods in the Context of Meshless Methods"

Awarded Best PhD Thesis in Computational Mechanics of Fluids by GIMC, 2017

M.Sc. in Mechanical Engineering, University of Salerno, 2011

B.Sc. in Mechanical Engineering, University of Salerno, 2009

Professional Experience:

1. Innovation Leader, CIMNE (Sept 2024 - Sept 2025)

Developed fluid-structure interaction models for descending aorta in collaboration with AORTYX (Barcelona)



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

2. Assistant Professor, Mechanics of Solids and Structures, University of Naples "Federico II" (Jul 2019 – Jul 2024)

Research on computational modeling of natural hazards: pyroclastic density currents, coastal flooding

Stabilization of multiphase flows via Variational Multiscale method

Coupled Lagrangian PFEM with Eulerian shallow water models

Principal Investigator, Italian PRIN Program (2023-2024)

Invited Researcher at CIMNE (2019–2023)

3. Postdoctoral Fellow, Polytechnic University of Milan (2016 – 2019)

Applied meshless methods to biomechanical problems

Developed numerical methods for fluid-structure interaction in the human eye

Simulated air-puff test and corneal surgeries; estimated corneal tissue properties in collaboration with industry

Research Highlights

Masonry Structures: Developed Continuous Airy-based method for Stress Singularities (CASS), optimizing Total Complementary Energy for no-tension materials; applied to vaults, domes, panels, and real cases; funded by VIRA, H2020 ISTOS

Biomechanics: Coupled Lagrangian and FEM approaches for simulating ocular and aortic fluid-structure interaction

Natural Hazards: Computational strategies for pyroclastic flows and coastal flooding; PRIN-funded projects, collaboration with national civil protection institutions

Teaching Experience

Course holder: Mechanics of Solids and Structures (University of Naples, 2019–2024)

Tutor: Mathematical Analysis, Fundamentals of Computational Mechanics, Mechanics of Solids and Structures (University of Pavia, Polytechnic University of Milan, 2012–2019)

Co-supervisor of 5 Master's and 4 PhD theses (Italy and Spain)

Invited lecturer at International Summer School on Historic Masonry Structures (2021–2025)

Awards & Recognitions

Best PhD Thesis in Computational Mechanics of Fluids, GIMC, 2017

Multiple PRIN projects as Principal Investigator

Academic Appointment

Won public competition as Associate Professor, Pegaso University, January 2025

Contract starting February 2026



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: TORRAS ANDRÉS, NÚRIA
Referencia: RYC2025-055027-I
Correo Electrónico: nuria.torras26@gmail.com
Título: From mirosystems to 3D bioprinted Organs-on-chip: advanced bioengineering for drug development and regenerative medicine

Resumen de la Memoria:

My research focuses on bioengineering, particularly on providing smart solutions for different tissue engineering applications, by developing tissue-mimetic microenvironments for in vitro studies; being 3D bioprinting, soft polymeric materials, photopolymerization and microfabrication technologies my strengths. After completing my PhD in Microelectronics Engineering at UAB (2014), where I worked on soft opto-mechanical actuators and trained in silicon-based microfabrication technologies, I joined IMB-CNM (CSIC) for a 1st postdoc (2014), focusing on designing smart microsystems for cell biology applications. My work on chip-on-cell and chip-in-a-cell concepts led various high-impact peer-reviewed publications, a book chapter, an R&D contract with a local company and a patent licensed to a spin-off company, together with collaborations around Europe, promoting multidisciplinary research. In 2017, I moved to IBEC for a 2nd postdoc, broadening my expertise in biomedical engineering, tissue engineering and leadership. There I led work packages in several national and European projects, including FETOpen BRIGHTER project, which led to a patent and the development of a novel light-sheet-based 3D printing technology. Since 2020, as Juan de la Cierva Fellow, I pioneered a new 3D bioprinting strategy to create tissue-mimetic microenvironments, and I co-directed two public-private R&D projects funded by Spanish and Catalan programs, based on this technology. Since 2019 I combine my research with teaching activities as assistant lecturer at Physics faculty (UB), and with the supervision and mentoring of graduate and master students and PhD candidates, while I actively participate in outreach initiatives to inspire future generations of researchers. Currently, I am co-leading the Ready-GUT initiative as entrepreneur scientist, focused on developing 3D bioprinted human intestinal models to accelerate drug development. This project received AGAUR funding (PRODUCTE & INNOVADORS) and has provided me with valuable experience and training in market analysis, business development and technology transfer, while fostering collaboration with industry stakeholders and investors. The proposed research will combine cutting-edge light-sheet 3D bioprinting technology with microfluidics to develop novel strategies for creating complex tissue models. By using innovative photopolymerizable hydrogels and incorporating relevant cell types, this project aims to engineer soft, 3D bioengineered in vitro models with microfeatures that closely mimic human tissues architecture. These tissue surrogates will be exposed to dynamic microenvironments through microfluidics to better emulate in vivo physiological conditions. The project will require advanced engineering approaches to address both technological and biological challenges, ultimately contributing to the development of next-generation models for drug development, regenerative medicine, and disease modeling. With my expertise in 3D bioprinting and tissue engineering. I am confident this project will push the boundaries of current bioengineering research and offer novel platforms for better understanding biological processes, fully matching the Ingeniería Biomédica (IBI) subarea, from Producción industrial, ingeniería civil e ingenierías para la sociedad (PIN) thematic area described in this call.

Resumen del Currículum Vitae:

I completed my PhD in Microelectronics Engineering at UAB (2014), where I worked on developing opto-mechanical actuators based on liquid-crystalline elastomer composites within the framework of an FP7-FETOpen project, and I was granted a visiting scholarship to perform research at UCI (USA) where I trained in characterization techniques of polymer nanocomposites. During my first postdoctoral period at IMB-CNM (CSIC) I focused on the design and FEM modeling of smart microsystems for cell-biology applications, thanks to my strong background in mechanics and silicon-based micro and nanotechnologies. I decided to explore tissue engineering and biomaterials field for my second postdoctoral period, joining the Biomimetic Systems for Cell engineering group at IBEC. There, I had the opportunity to expand my knowledge and training on leadership and entrepreneurial skills by dynamically participating in multidisciplinary projects and research collaborations, including partnership with academia, pharma and biotech companies and clinicians, from different funding schemes. I granted a Juan de la Cierva fellowship for the development of an innovative 3D bioprinting strategy to engineer in-vitro tissue-mimetic microenvironments and actively participated in the development of a disruptive light-sheet-based 3D bioprinting technology; therefore, establishing the foundations for my current research trajectory in bioengineering and 3D bioprinting. Regarding the outcomes of my research, I have co-authored 38 published papers (26 ranked in the First Quartile (Q1)), all of them being published in JCR indexed international journals and over 50% as Open access (14 first author, 3 sharing first position, 3 second author and 4 corresponding author), which accumulate 1085 citations, according to data available in Scopus with h-index of 19; 1 licensed patent and 1 more under licensing negotiations, 1 R&D contract; 2 book chapters, and over 45 conference presentations both at national and international levels. Works have been published in high impact journals (Nature Materials, IF: 43.840, Advanced Materials, IF: 26.800; Advanced Functional Materials, IF: 12.124; Nature Communications: 11.33; Biomaterials, IF: 8.806; Biofabrication, IF: 7.236; Biomaterials Advanced, IF: 6.0). As a researcher, I have been involved in the preparation, coordination and/or execution of 19 research competitive projects founded by separate funding bodies at European, national and regional levels, which have brought me the opportunity to establish collaborations, work with international and multidisciplinary teams, and get trained in different fields of expertise, ranging from electronics, materials science, bioengineering and 3D bioprinting. Thanks to that and my leadership skills, I have been involved in the technical coordination of a FET-Open, an ERC-PoC and Plan National projects, leading work-packages, and being a key member of the research teams. In parallel, I am engaged in teaching activities as an assistant lecturer at Electronic and Biomedical Engineering Dept. (Physics Faculty, UB), I served as Guest Associate Editor, and I regularly reviews for several journals in my field. I have supervised 6 graduate thesis and 8 master theses, and now I am supervising a team of 1 PhD candidate, 3 master students, 1 postdoctoral researcher and 1 research assistant.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: RODRÍGUEZ CIANCA, DAVID
Referencia: RYC2025-056968-I
Correo Electrónico: david.rodriguez.cianca@gmail.com
Título: A next generation of intelligent, adaptive and safe robotic assistive technologies for every-day use
Resumen de la Memoria:

The candidate is a recognized expert in wearable robotics (WRs), spanning novel mechatronic designs, advanced control strategies, human-robot interaction, and the evaluation of wearable robotic technologies to assist, enhance, and rehabilitate human mobility. After completing his Bachelor's and Master's degrees in Mechanical Engineering at the Polytechnic University of Madrid, he began his research activity at CSIC in 2014 working as research assistant in an EU-funded project. He later moved to Belgium in 2016, where he obtained a prestigious four-year Flemish doctoral fellowship and completed a 3-month EU-funded research stay at ETH Zurich. His PhD, awarded with the highest distinction at Vrije Universiteit Brussel, focused on developing and validating a novel treadmill-based gait-rehabilitation exoskeleton with advanced mechatronic systems, which was evaluated in healthy participants and stroke survivors.

He returned to Spain in 2021 to join the Neural Rehabilitation Group at the Cajal Institute (CSIC) as a postdoctoral researcher, where he co-led the "Rehabilitation robotics" research line. In 2023, he secured the competitive Juan de la Cierva-Formación fellowship, advancing a new generation of wearable robots with improved physical interaction capabilities through novel methodologies focused on the use of sensorized human-like robotic dummies. In 2024, he joined the Center for Automation and Robotics (CSIC-UPM) to initiate and lead the "Digital and physical human models" research line. In December 2024 he joined the Neuro-AI and Robotics group at the Cajal Neuroscience Center (CINC-CSIC) as a senior postdoctoral researcher, supported by a 4-year digital talent-attraction grant from CSIC, where he currently leads the Wearable Robotics and Wearable Robot Learning research lines.

Over more than 10 years, he has built strong international momentum through academic and industrial collaborations; sustained scientific productivity; student supervision and service to the research community. His competitive evaluations in national and European calls, together with top rankings in selection processes, demonstrate his capacity to lead an excellent, independent research program and consolidate a world-class research line in Spain. Within the RYC2025 fellowship, he aims to integrate robotics, biomechanics, and AI to achieve three goals: (i) understanding and improving human-exoskeleton interaction, (ii) developing personalized and adaptive AI-driven controllers, and (iii) enabling the deployment of wearable robots in complex daily environments. A central pillar of this vision is the use of cyber-physical human twins-personalized digital musculoskeletal models coupled with sensorized robotic replicas. This paradigm will support the creation of smart, intrinsically safe exoskeletons capable of autonomously adapting to the user, task, and context. Cyber-physical twins will provide a powerful training environment for AI controllers while enabling safe, user-specific evaluation of human-robot interaction. By overcoming the ethical and safety constraints of human testing, this approach ensures that only the most reliable solutions advance to human trials, paving the way for highly personalized, adaptive, and robust wearable robots for real-world use. The RYC2025 fellowship represents a unique opportunity for him to consolidate this ambitious agenda.

Resumen del Currículum Vitae:

David Rodríguez-Cianca is a recognized expert in wearable robotics (WRs), spanning novel mechatronic designs, advanced control strategies, human-robot interaction, and the evaluation of wearable robotic technologies. He holds a PhD in Engineering Sciences from Vrije Universiteit Brussel (2021, highest distinction). He earned his Bachelor's and Master's degrees in Mechanical Engineering from the Polytechnic University of Madrid and completed his doctoral training through a prestigious four-year Flemish fellowship, which included a three-month EU-funded research stay at ETH Zurich.

He is currently a Senior Postdoctoral Researcher at the Cajal Neuroscience Center (CINC-CSIC), where he leads the Wearable Robotics and Wearable Robot Learning research lines. He previously worked at the Cajal Institute and the Center for Automation and Robotics (CSIC-UPM), co-leading the rehabilitation robotics line and establishing the "Digital and physical human models" research area. He was awarded the Juan de la Cierva-Formación fellowship in 2023 and a CSIC digital talent-attraction grant in 2024. He also serves as Associate Professor at Universidad Autónoma de Madrid, coordinating the Rehabilitation Technologies course.

He has published 17 journal papers (15 Q1, 2 Q2), 14 conference papers, and has an h-index of 12 with 495 citations. He has participated in numerous EU and national research projects, serving as PI or co-PI in 7. His supervisory record includes two ongoing PhD theses (one industrial), one completed PhD thesis, eight Master's theses, eight Bachelor's theses, and a JAE Intro project. His service to the scientific community includes acting as guest editor for two journal special issues, reviewer for multiple international journals and conferences, member of the program committee for IEEE ROBOT 2024 and 2025, and associate editor for BioRob2026. He has been part of academic evaluation committees, including a university-wide PhD award panel, and has served as external examiner for PhD and Master's theses abroad. In 2025, he received the award for Best Bachelor's Thesis and internship supervisor at UAM's Polytechnic School.

He has significant experience in technology transfer and is co-inventor of two patents, including one granted in Europe, the US, and China and licensed to a spin-off. He also actively collaborates with the company Technaid S.L. towards the improvement of a commercial lower limb exoskeleton. His strong performance in competitive funding calls—including high evaluations in Horizon Europe and ERC, a second-place ranking in a CSIC tenure-track selection, and inclusion on the reserve list for the Ramón y Cajal 2023 and 2024 calls—demonstrates his leadership potential and the solidity of his research program. His trajectory and research vision place him in an exceptional position to generate scientific, technological, and societal impact. Awarding him the Ramón y Cajal fellowship will catalyze a high-impact, internationally competitive research program with clear potential for breakthrough innovation.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: VILAS PRIETO, JOSE LUIS
Referencia: RYC2025-057087-I
Correo Electrónico: jlvilas@cnb.csic.es
Título: Procesado de Imagen en crio-tomografía electrónica

Resumen de la Memoria:

The scientific-technical trajectory of the candidate began with a brief stage of research in applied optics in the use of polarized light. After this initial stage, he started as predoctoral student in a completely different field, the development of image processing methods in cryoEM. Both the doctoral thesis and the postdoctoral stage were carried out in this field, and it is also on which this proposal is based. CryoEM represents, therefore, the last 10 years of my research experience.

My research has centered on evaluating the quality of 3D reconstructions in cryo-EM, and therefore the resolution estimation (the smallest measurable structural detail above the noise level). Resolution measurement remains a key, ongoing challenge in the field. Resolution can be global (overall quality of the protein) or local (quality of specific regions). Local resolution, introduced in 2013, has since become a standard quality metric.

Resumen del Currículum Vitae:

José-Luis Vilas works in the field of Structural Biology and specializes in developing image-processing methods for Single Particle Analysis and Electron Tomography. His research has contributed to understanding and quantifying local resolution in cryoEM, enabling the objective assessment of image quality in both SPA and ET. He is the developer of several computational approaches such as MonoRes, local-directional resolution and MonoTomo, which are currently used in international facilities and commercial software. His research has led to 42 publications, 1800 citations and an h-index of 19 (Google Scholar, December 2025).

During his PhD at the BioComputing Unit (CNB-CSIC), he developed MonoRes, the first method for estimating continuous local resolution in cryoEM, highlighted by Nature Methods as a method of interest. This work established the mathematical foundation for new approaches to directional resolution and for the first local-resolution method in electron tomography. The Spanish Microscopy Society recognized his thesis with the Best PhD Award in 2020. During a postdoctoral stay at Yale University he developed the Fourier Shell Occupancy (FSO), a general metric for image quality in cryoEM that extends the current resolution standard (FSC) and has attracted significant community interest, published in Nature Methods.

Since his return to CNB-CSIC, he leads tomography developments within the BioComputing Unit. His algorithms are included in widely-used software packages Xmipp and Scipion, a framework used in more than 1,000 active projects and deployed in major international facilities including ESRF, CSSB Hamburg, Princeton, CNRS and UC Berkeley. Through these developments, he has contributed directly to technology transfer, scientific reproducibility, and the improvement of experimental workflows in international infrastructures. He has participated in more than twenty national and international projects and has obtained eight as PI.

He has contributed to society through collaborations with companies and research infrastructures, the integration of algorithms in commercial platforms, and the organization of training activities for the cryoEM community. Since 2023, he has led hands-on courses in electron tomography and has been invited as an instructor by institutions in the Republic of Korea, Australia, Brazil, Germany, Switzerland and the United States. He regularly participates in international networks and collaborative initiatives, accelerating the adoption of cryoEM methodologies.

He has contributed to training by supervising PhD, MSc and BSc students (3 current PhD, 2 MSc and 8 BSc), and by teaching Biomedical Imaging Techniques, Optics and Electromagnetism in undergraduate programs. He has served in academic evaluation committees, participated as reviewer for more than 20 scientific articles, and is Associate Editor of Frontiers in Bioinformatics. In addition, he has contributed to the organization of international workshops and seminar series related to cryoEM methods, and regularly participates in dissemination activities aimed at the broader scientific community.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: CALABRESE, VINCENZO

Referencia: RYC2025-056895-I

Correo Electrónico: vincenzo.calabrese@polymat.eu

Título: Rheology and dynamics of macromolecules under flow

Resumen de la Memoria:

The candidate is an experimental soft matter scientist with an established research focus on the dynamics of macromolecules, including polymers and colloids, under flow. By integrating experiments with theory, he has made significant contributions to understanding the interplay between macromolecular dynamics and the flow behavior of viscoelastic fluids. His strong experimental track record includes 35 publications, of which 17 are leading-author papers (15 first-author and 2 last-author), with 10 as corresponding author.

The candidate has received extensive international training in rheology and the flow properties of polymeric and colloidal fluids. His first solid research experience began during his MSc in Physical Chemistry of Food at Wageningen University (Netherlands), where he investigated protein-cellulose interactions. The high quality of this experimental thesis resulted in 3 peer-reviewed publications as second author. He subsequently completed a six-month industrial internship at the Nestlé Research Center in Lausanne, Switzerland, where he studied the rheological properties of legume fibers in complex media. This work led to a patented food formulation and a first-author publication in Food Hydrocolloids (IF: 11), in which he also served as corresponding author.

During his PhD (2016-2020) at the University of Bath, UK, the candidate focused on the self-assembly of cellulose nanorods in aqueous media, combining rheology with advanced scattering techniques, including X-ray and neutron scattering. This work resulted in six first-author publications (two as corresponding author). In addition, he successfully secured competitive beamtime at major international facilities, including the ISIS Neutron and Muon Source (UK), the Institut Laue-Langevin (France), and Diamond Light Source (UK).

In 2020, the candidate joined the Okinawa Institute of Science and Technology (OIST), Japan, where he spent five years, first as a postdoctoral researcher and subsequently as a Staff Scientist. During this period, he expanded his experimental expertise to include microfluidics and flow-induced birefringence. Notably, he was awarded the Early-Career Scientist Grant from the Japanese Society for the Promotion of Science (JSPS) for two consecutive terms, securing approximately €48K in funding.

In 2025, the candidate moved to Spain under the Talento Fellowship from the Xunta de Galicia, joining the University of A Coruña for a short period. In June 2025, after being awarded the prestigious La Caixa Junior Leader Fellowship, he moved to POLYMAT (UPV/EHU), where he is currently establishing his own independent research programme devoted to macromolecules under flow.

Overall, the candidate's international trajectory has enabled the development of a strong multidisciplinary research profile and a broad network of fruitful international collaborations.

Resumen del Currículum Vitae:

- Authored 35 peer-reviewed publications, including 15 as first author, 2 as last author, and 10 as corresponding author (>850 citations; h-index 16, Google Scholar).
- Awarded the La Caixa Junior Leader Fellowship, ranked 1st in the Physical Sciences panel.
- Awarded the Research Talent Fellowship from the Xunta de Galicia as an independent PI.
- Awarded the Early-Career Scientist Grant from the Japanese Society for the Promotion of Science (JSPS) for two consecutive terms, securing approximately €48k in research funding.
- Delivered 17 oral presentations at international events, including 2 invited keynote lectures.
- Disclosed one invention, with a patent filing in progress entitled "Precision-Controlled Fluidic Cell for Generating Extensional Flows".
- Recipient of the Rideal Bursary Award.
- Authored 3 educational publications dedicated to science communication.
- Developed and maintains a dedicated science communication website.
- Conducted over 30 peer reviews for leading journals, including Nature Communications (IF 14) and ACS Nano (IF 15.8).
- Mentored BSc, MSc, and PhD students, as well as junior postdoctoral researchers.
- Served as session chair at several international conferences, including the International Congress on Rheology (ICR, >1000 participants) and the Annual European Rheology Conference (AERC) in 2024 and 2025.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: DAVIDSON, JOSH
Referencia: RYC2025-056589-I
Correo Electrónico: joshuadavidson.jd@gmail.com
Título: Computational Hydrodynamics and Digital Modelling for Coastal and Offshore Infrastructures

Resumen de la Memoria:

Dr Davidson's scientific trajectory focuses on computational hydrodynamics for coastal and offshore engineering, integrating high-fidelity CFD, numerical wave tanks, nonlinear dynamics and data-driven modelling to predict environmental loads, structural response and fluid-structure instabilities. His career has been shaped by mobility across Australia, Ireland, Hungary and Spain, where he has progressively established his independence through PI roles, the development of new modelling capabilities and a coherent research line on wave-structure interaction.

His contributions include widely used methodologies for CFD-based numerical wave tanks, publications that are key references in the community, integrated frameworks linking CFD, control and power-takeoff models for floating platforms and wave-energy devices, and quantitative tools to detect and characterise nonlinear instabilities. He has collaborated with experts in wave energy, ship hydrodynamics and nonlinear dynamics to create unified modelling approaches, and has delivered tools for load prediction, stability assessment and environmental analysis to industry and public agencies.

At IHCantabria, the proposed research line will establish an Integrated Computational and Data-Driven Modelling Unit that unifies high-fidelity CFD, numerical wave tanks, surrogate models and machine learning in a framework serving multiple divisions. This represents a decisive broadening of his trajectory, extending proven methodologies from offshore renewables to civil-coastal infrastructure. His modelling tools will be adapted to breakwaters, port structures, overtopping prediction and coastal-hazard assessment, enabling high-resolution analysis of processes central to coastal safety and infrastructure design.

The programme will advance next-generation IHFOAM capabilities, develop hybrid physics-machine-learning surrogate models that reduce computational cost, and implement digital-twin concepts to support climate-risk assessment for ports and coastal systems. These tools will provide transversal modelling support across IHCantabria, linking experimental facilities with simulation, data assimilation and decision-support metrics for infrastructure resilience.

He will build a small research team with one postdoctoral researcher and one PhD candidate working on physics-informed surrogate models for coastal loading and structural response, integrating high-fidelity CFD with IHCantabria's experimental facilities to create validated digital frameworks. This effort aligns with European priorities in the Digital Twin Ocean, the Sustainable Blue Economy Partnership and climate adaptation, as well as national needs in hydraulic engineering and port-infrastructure resilience. It represents a consolidation stage in his career: from leading specialised groups to establishing permanent institutional capability, from individual simulation tools to integrated digital frameworks, and from sector-specific energy applications to a comprehensive civil-coastal modelling agenda that will reinforce Spain's competitiveness and IHCantabria's position as a national and European reference.

Resumen del Currículum Vitae:

Dr Josh Davidson is a computational hydrodynamics researcher with a strong international trajectory across Australia, Ireland, Hungary and Spain, specialising in high-fidelity simulation, numerical wave tanks (NWTs), nonlinear dynamics and data-driven modelling for coastal and offshore engineering. His scientific output includes 55 peer-reviewed publications (h-index 21, 1800+ citations SCOPUS) spanning hydrodynamics, stability analysis, control, surrogate modelling and wave-structure interaction. His review on CFD-based NWTs (233 citations) is a central reference in the field, and several methods he developed—such as reduced-order models derived from high-fidelity simulations and integrated wave-to-wire frameworks—have helped shape modern best practices in offshore and coastal modelling.

He has demonstrated clear scientific independence, acting as Principal Investigator on three competitive projects: a Marie Skłodowska-Curie Widening Fellowship (Hungary), a Commercialisation Feasibility project (Ireland), and a work-package leadership role in the ELKARTEK RUL-ET consortium (Spain). He has also secured €70,300 in industrial contracts with Flowserve, Mocean Energy, Wave Venture and others, delivering validated modelling tools for structural-load prediction, hydraulic-system design, platform dynamics and technology optimisation.

His research has strong societal and industrial relevance, contributing modelling tools for ocean-observation power supplies, wave-powered desalination, floating-platform stability and open-source workflows for engineering design. He has created tools adopted by industry and shared reproducible datasets and software via GitHub and Zenodo, supporting FAIR-aligned open science practices.

He plays an active role in international research governance. He is the CFD Subgroup Leader of IEA-OES Task 10 (2021–present), coordinating collaborative benchmark studies across Europe, North America and Asia; a long-standing contributor to the CCP-WSI validation programme; and an elected member of the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics. He co-organised the 2024 OceanFOAM Hackathon, has chaired technical sessions at OMAE and ASME, examined PhD theses at multiple institutions, and completed over 100 verified journal and conference reviews.

He has a substantial record of training and mentoring researchers. He has contributed to the supervision of PhD candidates in Ireland, Hungary and the UK (including one completed PhD now at TU Braunschweig), supervised 19 MSc/BSc theses with outcomes including PhD admissions at ETH Zurich



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

and NTNU, and mentored seven research interns. As a six-time Erasmus Mundus Scholar, he has taught advanced numerical-modelling courses to more than 150 international MSc students.

His achievements have been recognised through distinctions such as the Institution of Civil Engineers Baker Medal and faculty awards for research impact. Overall, his career demonstrates sustained international leadership, research independence, industrial engagement, and a coherent trajectory focused on developing advanced computational tools for resilient coastal and offshore civil-engineering infrastructure.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: NEBOT ANDRES, LAURA

Referencia: RYC2025-055531-I

Correo Electrónico: lauranebotandres@gmail.com

Título: Enhancing energy efficiency in CO2 refrigeration through subcooling

Resumen de la Memoria:

Dr. Nebot-Andres is an industrial and energy engineer with a distinguished track record in Thermal Engineering and sustainable vapor compression systems. Her research has focused on improving the energy efficiency of refrigeration cycles, with a pioneering specialization in the optimization of transcritical CO₂ systems through subcooling methods. Her career, initiated at the Thermal Engineering Research Group (GIT) of Universitat Jaume I, was articulated around the development and optimization of subcooling cycles for CO₂.

-Mechanical Subcooling: She developed and experimentally evaluated the Dedicated Mechanical Subcooling (DMS) cycle. These results established the foundation of her research. This work resulted in high-impact publications (one awarded as 'Best paper of the Journal'). Her doctoral thesis, for which she designed, built, and instrumented the experimental facility, allowed for the precise quantification of performance gains, achieving COP improvements of up to 28.7% with DMS and 21.3% with the IMS.

-Innovation in Subcooling: She expanded her research line by proposing the use of solid-state technologies (magnetic and elastocaloric) as auxiliary subcooling systems for CO₂ cycles, a novel application for these technologies.

-Refrigerant Blends: She investigated the addition of small quantities of other refrigerants to CO₂ to mitigate its pressure limitations, a line of work developed during a stay at the Università degli Studi di Udine which resulted in several publications.

She has demonstrated a strong international orientation through predoctoral stays at the Università degli Studi di Salerno (experts in solid-state and CO₂) and a 12-month postdoctoral stay at the Università degli Studi di Udine (pioneers in commercial CO₂). These mobilities have generated a collaborative consortium with universities in Italy and Slovenia. She is also the co-author of the proposal for the European CET Partnership SAFEHEAT project, which aims to develop a CO₂-water cascade, in which she is responsible for the experimental work package.

Currently, she is a postdoctoral researcher at Universidad Miguel Hernández (UMH), applying her knowledge of vapor compression cycles to heat pumps.

Her work has been recognized with prestigious awards, highlighting the Eurotherm Young Scientist Prize (every 4 years).

In terms of leadership and independence, she is the First Author and Corresponding Author on her main publications. She has served as PI (Principal Investigator) on a technology transfer project (€45,000) with a private company. Although her contractual status limits her role as PI on large public projects, she conceived and co-wrote the SAFEHEAT European project and leads its experimental WP.

The transfer of her research is tangible: the cycles optimized in her thesis are being implemented by leading companies in the sector in real installations (supermarkets). She has actively participated in private R&D projects, offering technical advice and specialized training in CO₂, tailored to the needs of each company. She actively contributes to scientific dissemination, drafting technical documents for the IIR and the United Nations, and has been an invited speaker at MIT's Thermal Transport Café (TTC). She has co-supervised a Cum Laude doctoral thesis and supervised numerous Bachelor's and Master's theses and evaluated ERC proposals.

Resumen del Currículum Vitae:

The applicant is a Juan de la Cierva Postdoctoral Researcher at the Miguel Hernández University of Elche (Energy Engineering Group) and was previously a researcher at the Thermal Engineering Research Group at Universitat Jaume I (UJI) until 2024. She holds a Ph.D. in Industrial Technologies and Materials from UJI (2022), achieved with Distinction Cum Laude, International Accreditation, and the Extraordinary Doctoral Award. Her research career, spanning 9 years, pioneers the improvement of transcritical CO₂ cycles using mechanical subcooling systems. While her early work and doctoral thesis focused on experimental commercial refrigeration using natural refrigerants CO₂ to enhance environmental sustainability, her current work focuses on vapor compression technologies for heat pumps. She aims to transfer her expertise in energy efficiency from refrigeration to heat production and the domestic sector. She has co-authored 42 JCR scientific articles in high-impact journals. Her work has garnered significant attention, with an h-index of 22 and over 1355 citations. Notably, 29 articles have over 10 citations, and two papers from her thesis have received 175 and 159 citations, respectively. She has also authored a scientific book chapter (Wiley) and co-authored over 70 communications at major international and national congresses (Gustav Lorentzen, CYTEF, CNIT). Her excellence has been recognized with prestigious awards, including the 2024 Eurotherm Young Scientist Prize (an international award given every 4 years), the 2018 Best Paper Award from the International Journal of Refrigeration, and various national distinctions (SECYTEF Young Researchers, REHVA Student Competition, HVACR ATECYR). In the last 8 years, she has participated in 7 competitive public R&D projects and 7 private R&D projects with companies, serving as Principal Investigator (PI) on one. These projects have funded laboratory facility construction and research activities. Her contribution to private industry is notable, involving technical advice, training, and product development. Evidence of this successful technology transfer is the implementation of the cycles developed during her doctoral thesis by several companies in real-world applications. She has completed research stays at the Università degli Studi di Salerno (6 months) and Università degli Studi di Udine (12 months) in Italy. Currently, she participates in a European CET Partnership project (SAFEHEAT) with MINES ParisTech (France) and Aalborg University (Denmark) and maintains active collaborations with experts in Italy, Slovenia, and Sweden. She is a member of Commission B2 of the International Institute of Refrigeration (IIR), contributing to technical documents and webinars. She serves as an Expert Evaluator for ERC grants (Starting, Consolidator, Advanced, Synergy) and sits on organizing and scientific committees for international conferences (CYTEF 2024/2026, CNIT 2023/2025). She has extensive teaching experience in thermal machines and engines at undergraduate and master's levels, including international teaching at INSA de Lyon and Salerno via Erasmus+. She has supervised numerous Bachelor's and Master's theses and one Ph.D. thesis (Outstanding Cum Laude, International Mention). She leads teaching innovation projects and actively engages in scientific dissemination, such as the MIT Thermal Transport Café.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: LÓPEZ VARO, PILAR
Referencia: RYC2025-056832-I
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Título: Characterization and Modeling of Perovskite Solar Cells and Tandem Devices

Resumen de la Memoria:

My line of research focuses on device modelling and characterization of perovskite solar cells and tandem devices under realistic conditions, focusing on the study the ion migration, aiming to jump the barrier of working operational mode from lab to field.

I started my research on the field of modelling and simulation of thin film electronic devices thanks to the grant of Formación del Profesorado Universitario FPU in the University of Granada (UGR). During my PhD thesis, I was focusing on the development of home-made simulators of different optoelectronic devices: phototransistors, and organic-, ferroelectric- and perovskite solar cells (PSCs). These simulators stand out for the inclusion of robust physical models at the interfaces which are the main parts that limit the performance of these devices, and the ion migration for PSCs. Throughout my thesis, I did several stays at McMaster University (Prof. Deen) and at Universidad Jaume I (Prof. Juan Bisquert) which led to the development of the numerical simulator which allow the interpretation of different experimental results, highlighting to be pioneers on the interpretation of the additional voltage due to the ions in the perovskite. From these collaborations important contributions were obtained. After my PhD Thesis, I received two national PostDoc contracts, in which I stressed my research on physical modelling of PSCs. Late in 2018, I moved to Institut Photovoltaïque d'Ile-de-France (IPVF), a private institute-enterprise, in which I stayed during the last 5 years. Our main goal is the transference of knowledge from the research to the industry. I have been working on device modelling and characterization of PSCs and tandem devices under realistic conditions. Recently, I have played as Principal Investigator in 4 projects to characterize ion migration by means of X-ray photoemission spectroscopy XPS on perovskite-based devices in Synchrotron SOLEIL (Paris) and BESSY (HZB-Berlin); and coordinating the collaboration between different labs. One of the main results from these projects, was starting up operando-XPS allowing to improve the performance of lateral PSCs. I have co-supervised 5 B.Sc. Students at UGR, 12 master students at IPVF, one PhD thesis at UGR and one PhD thesis at IPVF. So far, I have published 32 papers (Citations: 1550), most of them published in high impact papers, highlighting two reviews in Physics Report and Advanced Energy Materials. I have personally participated in 36 national and international conferences (10 Invited talks). I have been reviewer for the PVSC-IEEE conference and different journals, such as ACS Energy Letters and ACS Applied Materials & Interfaces and J. Phys. Chem. C.

In this grant, I propose to continuous very close to my actual research line, doing modelling and characterization of ion migration on a new architecture of perovskite-silicon tandem solar-battery cells (PSTBCs). Some studies have pointed out the interest of using ion migration to implement perovskite-based batteries. This fact brings the opportunity to develop perovskite-silicon tandem-battery structures in which the perovskite layer works not only as a solar cell, but also as a battery saving space on the energy storage. To achieve this goal different experimental characterization techniques combined with numerical simulation and machine learning will be used.

Resumen del Currículum Vitae:

Pilar López Varo is permanent Senior Researcher at the Institut Photovoltaïque d'Ile-de-France (IPVF). She is the work package leader of Characterization and Modelling at the EU project TRIUMPH: Triple junction solar modules based on perovskites and silicon for high performance and small environmental footprint. She completed a B.Sc. degree in Electronic Engineering in 2011 (with Best Mark Award); a M.S. degree in Physics in 2012; and an International Ph.D. degree in Physics in 2017 (with Cum Laude qualification, awarded Best PhD in Science) at the University of Granada (UGR), Granada, Spain. Her PhD dissertation was "Compact Modelling of Physical Mechanisms in Organic Solar Cells". The main contribution was the development of a numerical simulator for multilayer solar cells including ion migration that allowed to explain the performance of organic- and perovskite- solar cells and define ways of device optimization. Her PhD was supported by the grant "Formación del Profesorado Universitario FPU-13" from the Ministerio de Educación del Gobierno de España (MINECO). During this doctoral period, she did stays in two excellent research groups, one led by Prof. Jamal Deen (PhD co-director together with Prof. J.A. Jimenez-Tejada) at the University of McMaster (Canada) (6 months); and the other group led by Prof. Juan Bisquert at the UJI I (Castellón, Spain) (3 months). Just after her PhD Thesis, she received two national PostDoc contracts: "Contrato-Puente 2017-18" from UGR and PEREST Project from MINECO. During this period, she stressed her research on physical modelling of perovskite solar cells (PSCs). Late in 2018, she moved to IPVF, a private institute-enterprise, in which she has stayed during the last 6.7 years. Hers and this enterprise main goal is the transference of knowledge from the research to the industry. At IPVF, she works with Dr. Philip Schulz. She has been working on device modelling and characterization of PSCs and tandem devices under realistic conditions, aiming to jump the barrier of working operational mode from lab to field. Her work has been supported by international and national projects. Recently, she has played as Principal Investigator in 4 projects to characterize ion migration by means of X-ray photoemission spectroscopy XPS on perovskite-based devices in Synchrotron SOLEIL (Paris) and BESSY (HZB-Berlin); and coordinating the collaboration between different labs. During this period, she has collaborated with researchers from CNRS, Total-Energies, NREL, INAM, UPO and EPFL. From the academic perspective, she was teaching assistant at UGR (2014-18), receiving in 2018 the ANECA Certificate for "Profesor Contratado Doctor". From 2018, she has been teaching Physics in the Master of Renewable Energies in ENSTA and in l'École Polytechnique (France). She has co-supervised 5 B.Sc. Students at UGR and 12 master students at IPVF. She has co-supervised one PhD thesis at the UGR and one at IPVF. So far, she has published 32 papers (Cites: 1550, h-index: 17, i10: 25): 12 as first author, 7 as corresponding author and 4 as last author, most of them published in high impact papers, highlighting a review in Physics Report and Advanced Energy Materials. She has participated in 36 international conferences (10 Invited talks). She was session-chair at 46th IEEE PSC in 2021 and FuturePV25. She has been reviewer for different journals



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: PRIETO IBÁÑEZ, ANDRÉS JOSÉ
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Título: Generative AI for Early-Stage Feasibility Assessment of Modern Methods of Construction in Spanish Housing

Sector

Resumen de la Memoria:

My academic trajectory lies at the intersection of artificial intelligence (AI), service life prediction, heritage conservation, and digital construction management. Over more than a decade, I have developed a solid and multidisciplinary research line with scientific, social, and technological impact, focusing on predictive models and digital tools aimed at enhancing sustainability, efficiency, and resilience in the built environment. I earned a PhD with European Mention and Cum Laude distinction from the University of Seville, receiving the Extraordinary Doctorate Award. My training was enriched through research stays in Portugal (IST Lisbon), Italy (IUAV Venice), and Chile (UACH). In Chile, I served as assistant professor and PI of FONDECYT and FONDEF projects, strengthening academia-industry collaboration with the Chilean Chamber of Construction and public institutions. Since 2021, at Pontificia Universidad Católica de Chile, I have expanded my research on digital project management, climate resilience, and technological transformation of the construction sector, integrating frameworks such as BIM, IPD, and MMC. My work has produced tangible outcomes: over 30 JCR articles (78% in Q1/Q2 journals, 63% with international co-authorship), 6 book chapters, 1 patent, an edited book, and several applied tools. Notable contributions include fuzzy logic-based models and expert systems for service life prediction and preventive heritage management (e.g., FBSL, Art-Risk), as well as AI-powered decision-support tools like OptimizIA and Integria, already adopted by companies and institutions. I have collaborated with academic institutions in Spain, Portugal, Chile, Canada, Brazil, the Netherlands, and Ireland. I have co-supervised theses, served on academic committees, and acted as evaluator for ANID (Chile) and postgraduate programs, demonstrating my commitment to research training and knowledge transfer. My current research line aims to consolidate a disruptive approach by integrating Generative AI (GenAI) and agentic technologies to improve early-stage decision-making in construction projects, fostering more efficient, scalable, and sustainable processes. In this context, I propose developing a predictive model to assess the viability of adopting modern methods of construction (MMC) in the Spanish residential sector, contributing to the objectives of the PERTE for housing industrialization and aligning with Spain's ENIA and AESIA strategies. The Department of Architectural Construction II at the University of Seville provides an ideal environment for this project, due to its expertise in durability, building pathology, and digital technologies applied to the AEC sector.

Resumen del Currículum Vitae:

Dr. Andrés J. Prieto is an Assistant Professor at the Pontificia Universidad Católica de Chile, with a PhD in Architecture from the University of Seville (2017, Cum Laude with International Distinction and Extraordinary Doctorate Award). His research focuses on service life prediction, fuzzy logic, digital construction management, and AI-based tools for decision-making in architecture, engineering, and construction (AEC). He has held academic positions in Chile and Spain, consolidating a trajectory of international collaboration and interdisciplinary research. He has authored 36 peer-reviewed publications (32 indexed in WoS), with 78% in Q1/Q2 journals and 11 articles in the top 10% by CiteScore. His h-index is 19 (Scopus) and 24 (Google Scholar), with over 890 citations. Notably, he received the IUACC Best Publication Award and the Best Article Award (2023/24) by the University of Seville. He has presented 30 international conferences, co-authored 5 transfer products, and holds 1 patent. He led 4 national projects (Chile), including FONDEF and FONDECYT, totaling over €470,000, and participated in 9 other national/international projects (Chile/Spain). His international stays and collaborations include institutions from Europe and Latin America (e.g., TU Delft, NRC Canada, Univ. of Lisbon, Univ. Seville), enhancing his scientific maturity and global network. As principal investigator of the OptimizIA project (with CChC and CDT), and AI-driven airport infrastructure management (with SACYR and the Chilean Ministry of Public Works), he has demonstrated strong transfer capabilities. His work aligns with the Spanish ENIA and PERTE agendas, promoting AI adoption in the construction sector. In academia, he has taught over 3,000 hours and supervised 30+ theses, including PhD and postdoctoral research. He has coordinated master-level courses on sustainable design and heritage rehabilitation in Chile and Spain. He currently serves as Editor of the Revista de Ingeniería de Construcción (Scopus-indexed), evaluator for Chile's ANID and Ministry of Science, and holds ANECA accreditation as Profesor Titular (2025). His academic path shows leadership in AI for construction, a clear international projection, and a strong commitment to innovation with social and technological impact.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: CRIOLLO MANJARREZ, ROTMAN ALEJANDRO
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Título: Towards a Multiscale Predictive Framework for Managing Water & Energy - Climate Interactions in the Subsurface

Resumen de la Memoria:

Decarbonization efforts have increased the demand for clean and locally available energy, positioning geothermal and other subsurface resources as key elements of the energy transition. Despite their high potential, these resources remain underexploited due to major knowledge gaps in the coupled water-energy-climate processes that govern heat extraction, groundwater flow, geochemical reactions and environmental impacts.

OBJECTIVES

I) Advance the understanding of coupled subsurface processes, including groundwater flow dynamics, solute and heat transport, rainfall recharge and seawater intrusion, which control the performance and environmental safety of subsurface energy systems. It will be addressed through advanced numerical modelling, integration of existing datasets and the exploration of hybrid modelling approaches that can improve predictive capability.

II) Enhance reservoir characterization, by integrating hydrological, thermal, geochemical and structural properties to reduce uncertainty in system behaviour. This remains challenging due to subsurface heterogeneity and limited direct observations. Pilot sites at shallow and deep scales, combining in-situ methods with remote sensing, will support hypothesis testing, sensor validation and coordination with water authorities. The resulting open datasets will train hybrid models and serve as collaborative hubs with international partners.

III) Optimize resource exploitation, by developing strategies and guidelines that maximize energy extraction while ensuring environmental and operational safety. This will be achieved using advanced and hybrid modelling frameworks that combine process-based and data-driven approaches, supported by GIS tools for spatial analysis for informed operational designs.

IMPACT

This research line will contribute to national and European objectives related to climate neutrality, energy security and environmental protection. The models, datasets and pilot sites will foster international collaboration and inform decision-making to water and energy authorities. The project is expected to generate high impact scientific publications, conference contributions and stakeholder's engagement, supported by targeted dissemination efforts to policymakers, industry and the wider public.

FUNDING

Building a strong research network and working team will be essential. I will actively pursue competitive funding (e.g., ERCStG) and reinforce the research working team by attracting talent via schemes such as the MSCA Postdoctoral Fellowships and the Juan de la Cierva program. Collaboration with institutions will further consolidate an international environment that supports high-quality, collaborative research.

RESEARCH EVOLUTION

While my earlier stages focused on advancing numerical tools, groundwater characterization and assessing urban and coastal impacts, my postdoctoral work broadened this scope to include the coupling of thermal, hydraulic, geochemical and ecological. As a result, the proposed research line moves beyond problem-specific studies to develop a unified, multi-scale framework for understanding and predicting water-energy-climate interactions in the subsurface. This shift introduces hybrid modelling, advanced sensing, AI-ready datasets and pilot-site development as core pillars, enabling progress from diagnostic analyses toward predictive and decision-support science.

Resumen del Currículum Vitae:

HIGH QUALITY EDUCATION

I earned my high degree in Geological Engineering from the Universitat Politècnica de Catalunya (UPC) in 2011, while simultaneously working as a civil engineering consultant at SBS Ltd. and completing postgraduate studies in Private Infrastructure Management (2012). During my Master's in Geotechnical Engineering I joined the Hydrogeology Group (GHS, UPC-CSIC) working with Prof. Enric Vázquez-Suñé, where I contributed to R&D projects focused on hydrogeology and urban geothermal energy (2012). In 2015, I began an Industrial PhD in collaboration with the Barcelona City Council and UPC, which included a research stay at the University of Twente (The Netherlands) reinforcing my PhD integrating numerical modeling, uncertainty analysis, and water footprint assessment on urban groundwater management. My doctoral research Cum Laude in 2019 has 2 awards: IIAMA (Research Institute of Water and Environmental Engineering) and AGAUR (Catalan Agency for University and Research Grants).

GENERATION OF KNOWLEDGE AND RESEARCH EXPERIENCE

During the final stage of my PhD (2018), I joined IDAEA-CSIC as a postdoctoral researcher, working on projects on geothermal and hydrogeological systems (2021). There, I developed GIS and Machine Learning based platforms that provide transparent and reproducible workflows for subsurface characterization. I later received 2 competitive fellowships from the Balearic Islands Government (2021-2023; 2025-2028) to conduct research at IMEDEA (UIB-CSIC) on the subsurface water-energy-climate nexus in coastal aquifers, establishing a new research line.

In 2024, I was contracted within the ERC Proof-of-Concept CO2SINK project to study supercritical geothermal systems and CO2 storage with Prof. Víctor Vilarrasa. This work initiated a broader collaboration with Dr. Keita Yoshioka at the Univ. of Leoben (Austria): first as a visiting researcher and later as a Senior Lecturer, advancing coupled thermo-hydro-mechanical modeling. This synergy opened a new research line at Leoben and enabled collaborations with leading researchers in the field.

I have communicated my results through 3 patents, 26 open-access and peer-reviewed articles in leading scientific journals (with 2 currently under review and 2 in preparation), 31 technical reports, 70 national and international conference presentations (7 invited talks), 9 book chapters, and 7 open-access hydrogeological datasets. I have contributed to 11 competitive and 19 non-competitive research projects: Co-PI (3), Steering Committee member (3), Research Team (15), Team Leader (4), and Work Team (5).

TRANSFER OF KNOWLEDGE



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Turno General

I have mentored 2 PhD students, strengthening the GIS and machine-learning research line, and supervised 19 MSc theses (2 ongoing), delivering 16 international courses for PhD students and groundwater professionals and coordinating 3 international master's courses on hydrogeological and underground energy management. My teaching excellence is accredited by the National Agency for Quality Assessment and Accreditation (ANECA). Beyond academia, I actively promote geoscience outreach and collaboration, co-organizing general public events such as Geolodia2025, the Young Researcher Meetings (2015 - 2020), and sessions at the European Geosciences Union (EGU) General Assembly, where I served as the 2024 Early Career Scientists representative (EGU).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: FERNÁNDEZ DE LA HOZ, CAMINO

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Título: Species distribution modelling in the marine realm

Resumen de la Memoria:

My career began with a 6-month research fellowship at IHCantabria, where I explored the links between environmental predictors and marine flora, resulting in the publication of a Q1 paper. During this time, I participated in a COST Action international and multidisciplinary course, contributing to 2 SCI papers.

I pursued my PhD (2015-2019), supported by an FPI grant, focusing on the impact of climate change on macroalgae in Europe using species distribution modelling (SDM), which resulted in 3 Q1 papers. This research opened a new line of research in the Department, which has since expanded into a consolidated group (3 PhD, one of them co-supervised by me) supported by success in the financial resources obtained (C3N, C3N+, C3Npro, BioCa, SimuLIT).

A key achievement in my career is OCLE, a freely accessible high-resolution environmental predictors database (<https://ocle.ihcantabria.com/>), broadly used in different projects and researches. Recently, we updated it with the AR6 scenarios, further enhancing its utility. Using OCLE, we developed a methodological framework for temporally transferable SDMs, which we applied to assess the sensitivity of macroalgal species to climate change risks. This methodology has been successfully employed in management projects (FB-MPA, PIMA ADAPTA).

During my PhD, I also completed a 6-month predoctoral stay at the University of Ghent (Belgium), which resulted in a 2nd-authored study on invasive species. During my postdoctoral research, supported by an AGL contract (UC), I served as the PI for the FÉNIX project, which included a 25-month research stay at University College Dublin, resulted in a 2nd -authored work. Besides, at UCD I conducted field and laboratory experiments to study the combined effects of stressors on carbon storage in algae, a burgeoning field of research, which resulted in a work recently published lead by me. Additionally, in collaboration with the Diatom lab of the University of León, we developed a methodology to study microbial interactions and their role in algal resilience, published recently. Currently another collaborative work based on this study is under review in Microbial Ecology.

I have been the PI of the SimuLIT project, which focuses on advancing in joint modelling approaches for the whole community, a field with vast potential for ecological applications, but still in its early stages.

In summary, my research has resulted in 15 SCI papers (9 Q1, 6 as 1st author). I have actively transferred my research to diverse audiences. In academia, I have contributed to teaching activities in the Master's in Integrated Management of Water Systems at UC and co-supervised 1 PhD and 2 MSc theses. I presented findings at 8 international conferences and participated in invited sessions for managers by Fundación Biodiversidad and PT-PROTECMA. I have developed and delivered content for online courses in TRASMARES and AECID, providing tools for climate change risk management. For broader societal impact, I engaged in outreach initiatives such as 11F, La noche europea de I@s investigador@s, La semana de la ciencia, and my public dissemination efforts earned me first place in the #PhDenlaUC contest. Additionally, I was interviewed in the radio and lead an article for Quercus journal, highlighting the societal relevance of my work.

Resumen del Currículum Vitae:

My research has resulted in 15 published scientific articles (9 Q1, 6 as first author; 171 citations, h-index = 8). A key highlight is the development of OCLE (<https://ocle.ihcantabria.com/>), a database of high-resolution environmental predictors for historical and climate change scenarios (updated to AR6), freely available to the scientific community (de la Hoz et al. 2018, 2025). OCLE has been extensively used in multiple national and international projects (e.g., CoCoNet, EMBOS, PNACC) and by external researchers, demonstrating its broad impact.

I have made significant advancements in SDM methodologies, including temporal validation techniques and extensive modelling of macroalgal species distributions. These contributions have provided valuable insights into the impacts of climate change on species resilience and sensitivity, with applications in coastal management projects like FB-MPA and PIMA ADAPTA. I lead the SimuLIT project, developing innovative ecological joint modelling techniques for marine communities, showcasing my leadership in advancing research in this emerging field.

My international collaborations began with a six-month predoctoral stay at the University of Ghent (Belgium), resulting in a study on invasive species distributions (Delva et al., 2023). Later, I undertook a 25-month postdoctoral stay at University College Dublin (Ireland) as part of the FÉNIX project leader by me. This experience led to a collaborative publication (Mack et al., 2022) and a study focusing on the carbon sequestration potential of algae, a cutting-edge field with implications for climate change mitigation (de la Hoz et al. 2025).

I have fostered the next generation of scientists by establishing a stable SDM research line, which has been successful in the funding recruitment, with 5 projects granted (C3N, C3N+, C3Npro, BioCa, SimuLIT) and it's currently supporting two ongoing PhD projects and one completed PhD, one of which I co-supervise. This PhD contributes to understanding how foundation species adjust their behaviour and biological functions to endure increasingly harsh environmental conditions. Additionally, I have supervised two MSc theses on SDM-related topics, contributing to the development of expertise in ecological modelling among early-career researchers.

I have actively transferred my knowledge through various channels. In academia, I teach SDM methodologies as part of the Master's in Integrated Management of Water Systems at UC. For the scientific community, I have presented my findings at 8 international conferences and contributed to training sessions for managers, including invited talks for the Fundación Biodiversidad and PT-PROTECMA. I have also engaged policymakers and managers in adaptation strategies for marine protected areas (MPAs).

For the general public, I participated in outreach initiatives such as El día de la mujer en la ciencia, La noche europea de I@s investigador@s, La semana de la ciencia. I developed and contributed to online training for TRASMARES and AECID projects, fostering wider accessibility to my research. My work has been recognized with the first prize in the #PhDenlaUC contest for science communication, interviews with Cadena Ser and Radio Santoña, and a feature article in Quercus journal (2024, first author).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
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Título: Nanoemulsified phase change materials as next-generation lubricants for heat management and friction reduction

Resumen de la Memoria:

Optimizing lubrication systems is a key-issue to enhance energy efficiency and reduce emissions in industrial processes. Addressing this challenge demands for innovative solutions that simultaneously minimize friction and wear, ensure viscosity stability and provide effective heat management under severe operating conditions. Recent advances in colloid science and nanotechnology have opened a promising research avenue towards the development of multifunctional lubricants that integrate thermal buffering with tribological protection. Among these, nanoemulsified phase change materials (PCMs) represent a breakthrough concept, in which nanometric PCM droplets are uniformly dispersed within a lubricating oil. Such adaptive fluids combine the protective role of conventional lubricants with the dynamic thermal regulation through latent heat absorption during solid-liquid transition. When frictional heat drives PCM melting, the droplets act as localized thermal sinks, mitigating temperature spikes that could otherwise lead to significant viscosity changes or accelerate material degradation. In their solid state, PCM particles also reinforce the lubricant film, improving load-bearing capacity and reducing wear. The performance of these novel lubricant oils can benefit as well from the synergistic incorporation of high-conductivity nanoadditives (such as graphene or metal oxides), which further promote efficient heat dissipation, reduce friction coefficients and improve mechanical stability. Potential applications include wind turbines, high-performance engines or heat pump compressors, where conventional oils often fail to balance thermal stability and wear resistance.

The candidate began working on the design and thermophysical characterization of phase change material nanoemulsions in 2017, while working with the "Refrigerant and New Nanostructured Fluids" Group (Construction Technologies Institute, National Research Council, Italy). Until now, the primary goal of his investigations in this topic has been the development of heat transfer and storage materials. Building on the expertise gained since then, the proposed research takes a decisive step forward: applying PCM-based nanoemulsions as advanced nanolubricants. This innovative approach will involve exploring rheological and tribological performance, stability under mechanical stress and assessing potential benefits in reducing friction and wear in industrial systems. The investigations will align with the interest of the "Tribology and Advanced Lubricants" subgroup (Prof. J. Fernández, University of Santiago) from whose laboratory resources would provide significant benefits. To ensure practical relevance, the research project will also design and deploy, supported by the Ramón y Cajal Program, an experimental platform to simulate real operating conditions in heat pump compressors, enabling rigorous testing under thermal and mechanical loads. Planned activities include formulation optimization, thermal-physical characterization and performance evaluation in laboratory-scale setups, requiring a multidisciplinary approach that integrates chemistry, material science and mechanical engineering. The ultimate goal is to contribute to a next-generation of lubrication solutions with superior efficiency, durability and adaptability.

Resumen del Currículum Vitae:

The candidate received his BSc in Industrial Engineering with Extraordinary Award in 2010. He then pursued MSc in "Energy and Sustainability" (2010-2011) and "Applied Physics" (2011-2012). In November 2010, he began working at OCV S.L. company, collaborating in the project "Design of a Modular Platform for the Development of Thermal Solar Collectors," supported by the Spanish Centre for Development of Industrial Technology (CDTI). From 2011 to 2016, he worked on his PhD titled "Development of New Heat Transfer Media for Improving Efficiency in Energy Systems: Conventional Fluids and Nanofluids", which obtained International Mention and Extraordinary Doctorate Award. This research was conducted within various projects supported by the Spanish Ministry of Economy, Industry and Competitiveness, and he received fellowships from Iberdrola Foundation, Xunta de Galicia, and Spanish Ministry of Education, Culture and Sports.

In June 2017, he enrolled the Italian group of "Refrigerant and new nanostructured fluids" leaded by Dr. Laura Fedele at the "Construction Technologies Institute" (National Research Council, Italy). There, he started researching on the development of phase change material nanoemulsions and contributed to the European project "Demonstration of Renewable Electricity for Heating/Cooling Technologies". Between November 2018 and June 2019, he collaborated with Prof. Patrice Estellé at the Laboratoire de Génie Civil et Génie Mécanique (Institut Universitaire de Technologie, France). At the French institution, he investigated strategies to enhance the thermal performance of phase change materials, with several tasks connected to the "Naturally High-Performance Insulation ISO BIO" project (European Union's Horizon 2020 program). He then moved to University of Vigo, where he worked on implementing the Research Line on phase change material nanoemulsions for energy applications until April 2025.

Throughout his career, he has also completed research stays at Aoyama Gakuin University (Japan), University of Valladolid (Spain), Rzeszów University of Technology (Poland), Saint Petersburg University (Russia) and Lisbon University (Portugal).

The applicant's research activities have resulted in 58 research articles (first author in 19, corresponding author in 10, 87% co-authored with international researchers), some published in high-impact journals such as Renew. Sustain. Energy Rev. (IF: 16.3) or J. Mol. Liqui. (IF: 5.3). He has garnered >2400 citations and holds h-index= 31 (Scopus). He has contributed to 66 scientific conferences and symposia, delivered 18 oral presentations, given one invited keynote and served as a chair in two sessions. He has supervised one PhD thesis (with another ongoing since 2025) and three BSc theses (one at the University of Padova and another in collaboration with Kyungpook National University, Korea). He has been a member of research teams in 16 projects/networks and 11 R&D+i research contracts (serving as PI in one and co-PI in another). Additionally, he has served as Guest Editor for the Special Issues "Colloids and Nanofluids for Energy Management" (Nanomaterials, IF: 4.3) and "New Trends and Processes in Nanofluids and



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Carbon-Based Nanoparticles" (Processes, IF: 2.8). He is a member of the Reviewer Board of Appl. Sci. (IF: 2.5) and has reviewed over 150 articles across nearly 40 journals.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: FERNÁNDEZ GONZÁLEZ, DANIEL
Referencia: RYC2025-055530-I
Correo Electrónico: d.fernandez@cinn.es
Título: Novel methods of production of materials based on fast and/or environmentally sustainable technologies

Resumen de la Memoria:

My research career has developed in the field of production of engineering materials for structural and functional materials and, as part of the production process, the valorisation of industrial wastes was a fundamental part of my research field. I started my research career with an investigation about the utilization of concentrated solar energy in the production of iron by solar carbothermal reduction. From that moment, the utilization of concentrated solar energy in the synthesis of materials and in the valorisation of industrial residues was my main personal research line, becoming me in top author in the topic "Solar Energy Applications in Material Processing" according to Scopus, with 17 papers, including the fundamental reviews in the topic "Concentrated solar energy applications in materials science and metallurgy" (Solar Energy, 2018) and "A State-Of-The-Art Review on Materials Production and Processing Using Solar Energy" (Mineral Processing and Extractive Metallurgy Reviews, 2025). Within the topic of solar energy, two main research sub-lines: the synthesis of materials (mainly ceramic materials, but also ferroalloys and metals) and the valorisation of industrial residues (slags or fines of electro filter from metallurgical industries). Around this sustainable production of materials, my research career has focused on the utilisation of conventional or advanced techniques to produce materials, particularly ceramic materials, and also valorise industrial residues using environmentally sustainable approaches (mainly due to the contracts with industrial companies, where I can mention the production of manganese from residues from the zinc electrolysis process). The topic of production of ceramics has developed over the years: at the beginning more aligned with structural applications (i.e. the synthesis and sintering of ceramic (nano)composites for the refractory lining in furnaces dedicated to the fabrication of metals), and nowadays, just after my incorporation to the CINN-CSIC, more aligned with the functional applications (i.e. the synthesis and sintering of graphite-metal composites for heat dissipation or the production of lead-free piezoceramic materials) using advanced technologies of sintering (spark plasma sintering, lasers, microwave or cold sintering). Despite the large number of materials studied over the years, my research career is clearly aligned with new methods of production that might contribute to increasing the productivity, improving the properties of the produced materials or enhancing the sustainability of the process, apart from, obviously, being more environmentally friendly.

Resumen del Currículum Vitae:

My career has focused on the utilization of concentrated solar energy (CSE) in the synthesis of materials and in the valorisation of industrial wastes (more than 10 publications in the topic), assuming the leading role in different projects, as that funded by the European Union's Horizon Europe programme via RISEnergy or two contracts with important companies, as Arcelor Mittal and Cementos Molins. My investigations have also aligned with the utilisation of advanced techniques in the synthesis and sintering of ceramic materials (laser, microwave, spark plasma sintering and, recently, cold sintering), where I have been a leader of several WPs in projects of the regional and national calls. In numbers, I have participated in > 10 competitive projects, as well as in >10 contracts with industrial companies. Regarding personal fellowships obtained in a competitive call, I got the FPU and Juan de la Cierva Formación grants.

I am the author of 55 JCR articles, 35 as corresponding author and 20 as first author. This way, I have a h-index of 20 and i10 of 36, accounting for 1405 cites. I am the author of 6 books, five published in English by Springer and indexed in Scopus, and accessed >40000 times. I have made more than 30 contributions to national and international congresses. I terms of collaborations, I maintain a stable collaboration with national institutions, such as the UPV, the ICMM, the UPM or the USC, and international institutions, such as the Universidad de Roma La Sapienza (Italy), the Universidad Veracruzana (México) or the AGH University (Poland), where I spent 3 months in 2017. Nowadays, I am involved in a Bilateral Agreement with the Slovak Academy of Sciences to conduct a project related to the design and development of 3D structures for scaffolds for tissue engineering. Regarding the collaboration with Mexican universities, I have already published more than 20 articles, and I have been responsible for several exchanges of students and doctors. I have also spent 2 months in the laboratory PROcédés Matériaux et Energie Solaire - CNRS in different periods to conduct experimental work in the solar furnace.

I have directed 3 PhD theses with the qualification of "sobresaliente", 1 TFG and 1 project to obtain the Degree in Nanotechnologies at the Universidad Tecnológica Metropolitana de Aguascalientes (Mexico). I have > 200 hours of teaching experience in subjects (Structure and Properties of Materials, Iron and Steelmaking Technologies, Metallurgical Engineering and Cement and Concrete) of the bachelor's and master in the School of Mines of the University of Oviedo. I got the ANECA accreditation as Profesor Ayudante Doctor, Profesor Contratado Doctor and Profesor de Universidad Privada in 2019.

Regarding networks, I have assumed a leading role as representative of the CINN-CSIC in the red Sustainable Nano funded by the Ministry of Science, Innovation and Universities, which resulted in the publication of Libro Blanco de las Nanotecnologías III, where I was coordinator of the chapter dedicated to "Energía".

Finally, I have been responsible for the CINN-CSIC in the Feria de la Ciencia de Asturias (2024 and 2025), and I have given different talks to the general audience organised by city halls. My research has been praised several times: Premio Extraordinario Doctorado UNIOVI and Award of the Real Academia de Doctores de España.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: YESTE DONAIRE, PATRICIO
Referencia: RYC2025-055547-I
Correo Electrónico: pyeste@protonmail.com
Título: Advancing hydrologic process understanding and quantification at the regional scale
Resumen de la Memoria:

I am a Civil Engineer specialized in Hydrology, and I hold a PhD in Physics and Space Sciences from the University of Granada. I currently work as a postdoctoral researcher at the University of Potsdam (Germany) supported by a prestigious Humboldt Research Fellowship for Postdoctoral Researchers. My research focuses on the intersection between land-surface modelling and large-sample hydrology, the assessment of climate change impacts on the water cycle, the integration of satellite and in-situ hydrologic observations, and the application and development of differentiable, physics-informed machine learning models for large-sample hydrology.

I did my PhD at the Department of Applied Physics at the University of Granada. My PhD was funded through a highly competitive FPU Fellowship, and my research focused on the potential of land-surface modelling for quantifying climate change impacts over the Iberian Peninsula within a large-sample hydrology framework. The novelty of this line of research was recognized with a Young Researcher Prize at the XI Conference of the Spanish Association of Climatology, marking a major achievement early in my PhD and providing significant motivation for my academic development. As an FPU Fellow, I progressively gained scientific independence while conducting research in an interdisciplinary research environment. I expanded my expertise through a predoctoral research stay in the Hydrology and Quantitative Water Management Group at Wageningen University (the Netherlands), where I could explore innovative methodologies for integrating in-situ streamflow and satellite-based evapotranspiration data into land-surface models. My PhD culminated in receiving the Prize for the Best PhD Dissertation in Climatology awarded by the Spanish Association of Climatology.

After completing my doctorate, I expanded my expertise through a research stay at the GFZ Helmholtz Centre for Geosciences (Germany), supported by a competitive Helmholtz Visiting Researcher Grant from the Helmholtz Information & Data Science Academy (HiDA). Our goal was to enhance process representation in hydrologic models through the joint analysis of in-situ observations and model simulations, with a particular emphasis on subsurface water storage. I was later awarded a prestigious and highly competitive Humboldt Research Fellowship for Postdoctoral Researchers from the Alexander von Humboldt Foundation, which allowed me to join the University of Potsdam to deepen my work on land-surface modelling and the integration of satellite and in-situ data into sensitivity analysis and optimization settings. Building on this experience, my next step is to return to GFZ in January 2026 supported by a competitive UGR-Banco Santander Postdoctoral Fellowship. My goal is to develop advanced physics-informed machine learning models and strengthen collaborations within one of Europe's leading centers in hydrology and Earth system science.

During my RyC contract, I plan to advance the estimation of groundwater recharge over Spain through differentiable modelling. This line of research will allow me to firmly establish myself as an independent researcher, but more importantly, the RyC contract will support better-informed water-management strategies in a changing climate, both within Spain and beyond.

Resumen del Currículum Vitae:

Despite being in the early stage of my research career, I have already established a strong publication record. I have published 13 peer-reviewed articles (9 in Q1 journals, among which 6 are D1), including 6 as first author and 4 as corresponding author. In addition, I have contributed 1 book chapter. My work has been also actively disseminated at scientific conferences, with a total of 41 conference contributions—23 oral and 18 poster presentations, including 12 proceedings papers—13 of which I presented as first author. The influence of my research is also reflected in standard academic metrics: according to Google Scholar, I have an h-index of 9 with 257 citations, while WoS reports an h-index of 8 with 162 citations. To support my lines of research, I have secured a total of €227.799 in competitive funding, including 3 projects as PI (2 international, among them the prestigious Humboldt Research Fellowship, and 1 national), as well as the highly competitive FPU Fellowship and a Research Stay Grant during my PhD. I have been also member of the research team in 5 national projects.

My work has societal relevance because it provides tools to improve water resource assessment, drought risk evaluation and climate adaptation planning. I have contributed to methodological developments that support regional water management and early-warning systems, such as those used to monitor floods in Spain and Germany. I regularly communicate results to scientific and non-academic audiences through conference presentations, workshops, and outreach activities. My research offers actionable insights for institutions responsible for water management.

I have carried out teaching activities (18 ECTS) as a laboratory instructor for several general physics courses at the University of Granada. Such activities provided me with extensive experience in evaluating and guiding students. I am also a member of the Core Team of the Geo.X Early Career Scientist (ECS) Section, where I contribute to supporting early career researchers in the Earth and planetary sciences within the Geo.X network. As part of my tasks in the Geo.X ECS Core Team, I actively participate in the allocation of funds through the ECS Community Grant, which supports workshops, seminars, talks, and networking events for early career scientists within the Geo.X network. Since my involvement, we have funded 5 applications for a total amount of €18.914,62.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: KRUPA GARCÍA, PABLO
Referencia: RYC2025-055834-I
Correo Electrónico: pablokrupa@gmail.com
Título: Towards efficient and effective implementation of MPC in real-life applications

Resumen de la Memoria:

Pablo Krupa did his PhD thesis in the Universidad de Sevilla, obtaining his title in 2021. During his PhD he visited Mitsubishi Electric Research Laboratories, Cambridge, USA, where we worked on the implementation of predictive controllers in building heat and ventilation systems. After his thesis, he was at the Universidad de Sevilla as a postdoc student under the FPI 2017 grant. He then obtained the Margarita Salas grant, with which he performed a 2 year visit to IMT School for Advanced Studies, Italy. After that, in 2024 he was a postdoc at the Computer Science group at Gran Sasso Science Institute, L'Aquila, Italy. Finally, since January 2025, he is a postdoc at the ERC Advanced Grant COMPACT, whose principal investigator is Prof. Alberto Bemporad, at IMT School for Advanced Studies, Lucca, Italy.

His main research lines are:

- Model Predictive Control (MPC): efficient implementation of MPC, embedded systems, MPC control theory, novel MPC formulations, robust MPC, offset-free nonlinear MPC.
- Optimization: restart methods for accelerated first-order methods, certification of optimization algorithms.
- Learning: preference-based learning, system identification through machine learning, approximate nonlinear MPC with stability guarantees.

Resumen del Currículum Vitae:

Pablo Krupa is the author of 12 articles in Q1/Q2 journals and 10 articles in international congresses. He has also co-organized the tutorial session "Model predictive control for tracking using artificial references: Fundamentals, recent results and practical implementation", at the Conference on Decision and Control, 2024. His main contributions are in the fields of Model Predictive Control (MPC) and Optimization Algorithms (OAs), where he has worked on topics such as: implementation of MPC in embedded systems, robust MPC, accelerated OAs and certification of OAs. These topics contribute towards the use of MPC in the process and aerospace industries. Additionally, he has worked on the certification of OAs when implemented in fixed-point arithmetic, a topic which is of great interest to the aerospace industry, since fixed-point circuits are faster and less energy-consuming than the floating-point counterpart typically found in modern-day computers.

All his publications are available in open access. Furthermore, his optimization algorithms and MPC solvers are available as open-source software in the GitHub repositories <https://github.com/GepocUS/Spices> and <https://github.com/GepocUS/GepocToolbox>, which he currently maintains and develops.

His work has contributed to several research projects in the Universidad de Sevilla. The most noteworthy of these projects is "Desarrollo de la herramienta SPCIES", which is based on the results obtained during his PhD thesis. In fact, Pablo Krupa is one of the lead researchers of the project and one of the main contributors to its initial proposal. The aim of the project is the development of an industrial version of the open-source Spices toolbox mentioned in the previous paragraph. A software tool has been developed, whose intellectual property has been registered with the Universidad de Sevilla.

He has collaborated with multiple international researchers during his two international visits. First, he was a visiting researcher at Mitsubishi Electric Research Laboratories (MERL), Cambridge, USA, where he worked on the development of MPC for controlling building heat and ventilation systems. Then, as a beneficiary of the grand Margarita Salas, he has also spent two years (2022-2023) as a visiting postdoc in IMT School of Advanced Studies, Lucca, Italy, where he has worked on several research lines related to MPC and optimization. In 2024, he was a postdoc student at the Gran Sasso Science Institute, L'Aquila, Italy, working on formal verification methods for certification of optimization algorithms, and methods for solving multi-agent task-allocation problems. Since January 2025, he is a postdoc at IMT School for Advanced Studies, Lucca, Italy, contracted under the ERC Advanced Grant COMPACT, whose principal investigator is Prof. Alberto Bemporad.

He is also devoted to teaching. He has co-supervised 7 degree and master thesis, taught several laboratory classes (totaling 135 hours), and is currently co-supervisor of three PhD students.

Finally, he has obtained the accreditations of "Ayudante Doctor" and "Contratado Doctor" from ANECA, and has been awarded the prizes "Best scientific article (April-June 2021)" from the Escuela Técnica Superior de Ingeniería, Universidad de Sevilla, and "Premio Extraordinario de Doctorado 2020/2021" from the Universidad de Sevilla.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: WILLIAMSON, HANNAH
Referencia: RYC2025-054242-I
Correo Electrónico: hgwilliamson@gmail.com
Título: Socioeconomic Inequality, Stress, and the Dynamics of Couple and Family Relationships

Resumen de la Memoria:

My research program examines how stress, socioeconomic conditions, and cultural contexts shape couple and family functioning. I have developed an independent and internationally visible trajectory that integrates diverse methodological approaches, including longitudinal, observational, daily diary, experimental, and randomized controlled trial designs with analyses of large-scale datasets. Across this work, I have advanced a contextualized understanding of intimate relationships that emphasizes how partners interpret and navigate the conditions in which their relationships unfold.

My contributions span five core areas, supported by competitive national funding. First, I have identified how stress influences communication, support, and perceptual accuracy, demonstrating that stress alters not only what partners do but how they understand each other's needs. Second, by leveraging natural experiments such as the COVID-19 pandemic and sudden natural disasters, I have shown that shared adversity can prompt adaptive shifts in meaning and relational resilience, challenging traditional assumptions about the uniformly negative effects of stress. Third, I have advanced methodological rigor and representation in relationship science by documenting demographic biases and offering concrete strategies to improve diversity, transparency, and generalizability. Fourth, I have uncovered behavioral and experiential pathways through which socioeconomic inequality shapes time use, emotional strain, and the quality of everyday interactions. Finally, I have clarified mechanisms of change in relationship education programs, including applying machine learning to identify which couples benefit most and why. Together, these contributions have been influential in shaping theoretical, empirical, and methodological discussions in the field.

Building directly on this trajectory, the research line I propose examines how economic precarity in Spain is reshaping the meaning and expression of commitment. Spain has experienced rapid changes in partnership formation, including rising *pareja de hecho* registrations, delayed marriage, and prolonged cohabitation, yet the psychological processes guiding these choices are not well understood. Existing SES-relationship models were developed in contexts with different welfare structures and pathways to adulthood, limiting their explanatory power for contemporary Spain.

The goal of this research line is to develop an empirically grounded framework explaining how material constraints shape people's interpretations of union choices, their sense of readiness to formalize a relationship, and their expectations for stability and wellbeing. Integrating evidence from national datasets with qualitative insight and targeted empirical testing, the project will clarify how economic precarity shapes relational meaning in ways not captured by current theories.

Resumen del Currículum Vitae:

I earned my PhD in Psychology from the University of California, Los Angeles in 2017, where I developed a strong early record of productivity and recognition. During my doctoral training I published 12 peer-reviewed articles in top journals (nine as first author), received the National Science Foundation Graduate Research Fellowship, and earned multiple competitive awards, including the UCLA Dissertation Year Fellowship and national research awards from APA, the Society for a Science of Clinical Psychology, and Psi Chi. I also secured a national grant to support my dissertation.

After completing my PhD, I joined the University of Texas at Austin as an Assistant Professor and later advanced to Associate Professor. I have built a sustained publication record of 38 peer-reviewed articles, 37 in Q1 journals. My portfolio includes three sole-authored articles, 21 first-authored articles, and eight senior-authored papers, reflecting leadership in conceptual development, study design, supervision of junior collaborators, and direction of analyses. My work appears in leading outlets such as *Psychological Science*, *Journal of Marriage and Family*, and *Journal of Consulting and Clinical Psychology*, and several papers have been among the most downloaded or most cited in their journals. My contributions have been recognized with the APS Rising Star Award (2022) and the ABCT Early Career Contributions to Couple Relationships Award (2023).

I also have a strong record of external funding as Principal Investigator. I received a Fulbright Scholar Award to support international collaboration and have led three multi-year U.S. national grants focused on youth, families, and relationship processes. In total I have secured more than \$1.75 million in funding for my research lab.

My work has a clear international dimension. I have collaborated with colleagues in Spain, Turkey, Thailand, and China, resulting in published cross-cultural work and several manuscripts under review. I have also been invited to review proposals for major national and international funding agencies, including the European Research Council, the Israel Science Foundation, and the Swiss National Science Foundation.

Teaching and mentoring are central to my academic career. I have supervised four undergraduate theses, four master's theses, and one doctoral dissertation, and I have five years of teaching experience, including undergraduate and graduate courses.

I also maintain an active record of scientific service and public engagement. As Associate Editor at the *Journal of Family Psychology*, I have handled more than 140 manuscripts and mentored editorial fellows. I am Guest Editor of a Special Issue of *Personal Relationships* focused on methodological innovation. My outreach includes practitioner-focused articles, op-eds, and media engagement, and I serve on a national expert working group that integrates research evidence into family support programs.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: HAIMERL, CAROLINE
Referencia: RYC2025-055372-I
Correo Electrónico: caroline.haimerl@gmail.com
Título: Postdoctoral researcher

Resumen de la Memoria:

My scientific trajectory has centred on understanding how neural systems coordinate behaviour across multiple spatial and temporal scales. From early work on hippocampal assemblies encoding time-distance continua to current research on multi-area control, my research integrates mathematical modelling, machine learning, and neuroscience to uncover principles of adaptive behaviour. A core theme of my trajectory is to explain how complex actions emerge from shared neural architectures. During my PhD, I developed a theoretical framework showing how low-dimensional stochastic modulation can label task-relevant neurons and enable flexible readout. Later, my work at Google Brain highlighted how heterogeneous computational modules jointly support multi-task learning. These insights motivated a broader perspective: neural circuits at different levels of the motor and cognitive hierarchy may solve related control problems on different timescales, from rapid sensorimotor adjustments to slow behavioural planning. As an independent researcher, I extended this idea in two major directions. First, I developed a theory of representational drift driven by slow fluctuations in neuronal excitability. This work showed how population codes can change over days or weeks while behaviour remains stable, without requiring synaptic plasticity. It generated concrete experimental predictions and explained findings across brain areas, task modalities and species. Second, I proposed a framework in which action prediction itself can drive the development of abstract internal "world models". In this view, neural representations are shaped not only by sensory input, but by the need to plan and evaluate sequences of actions in dynamic environments. My projects converge on a central hypothesis: hierarchical action plans are a fundamental organizing principle for neural computation, and to understand individual brain areas' computations we need to consider multiarea interactions. Future work aims to formalize how hierarchical action representations, parallel policy learning, and neuromodulatory control jointly support flexible behaviour. I will develop computational models that link cortical, basal ganglia and hippocampal circuits to multiscale action planning, and test them with neural population recordings and behavioural data from rodents and primates through existing international collaborations (University of Chicago, New York University, Champalimaud Centre). My research line therefore combines normative theory, mechanistic modeling and experimental collaborations, enabling a full theory-data loop. By building principled frameworks that bridge neural activity and behaviour, my goal is to explain how the brain achieves coordinated and flexible control, and to establish this research program under the Ramón y Cajal fellowship.

Resumen del Currículum Vitae:

I am a theoretical neuroscientist working on multiarea neural computation and adaptive behaviour. I completed my PhD at New York University, where I developed a framework showing how low-dimensional stochastic gain modulation enables fast task switching in hierarchical neural systems. This work explained flexible sensory decisions, was validated in macaque V1/MT (collaboration with Dr. Cohen, UChicago), and led to a first-author article in Nature Communications and two first-author papers at NeurIPS. I received the Google PhD Fellowship and 2022 the NYU Dissertation Award. Before my PhD, I worked on computational and data-analysis studies of hippocampal representations of time-distance continua, published in PNAS (first author) and Science (co-author). I expanded my machine learning expertise in a research internship at Google Brain, co-designing heterogeneous mixture-of-experts models to scale transformer architectures to multi-task learning. These ideas inspired me in developing a multi-area neural modeling framework published as a first-author article in Annual Review of Neuroscience, in a collaboration with Dr. Paton at the Champalimaud Centre. As a postdoctoral researcher with Dr. Machens at the Champalimaud Centre, I developed a theory of representational drift that resolves long-standing debates around synaptic plasticity. Using analytically tractable models and spiking simulations, I showed how excitability fluctuations generate drift without requiring downstream tuning. The work reproduces experimental results, makes testable predictions, and is under review at Nature Neuroscience. In parallel, I developed a mathematical framework to model cortical action representations, showing that movement planning itself can drive reference frame transformations. This work sparked global interest with multiple invited talks across Europe and the United States, and led me to co-develop and co-advise two PhD student projects. Further, I received the SURFiN award to supervise an undergraduate student investigating predictive objectives in neural networks. In 2024 I received the prestigious Simons Transition to Independence Award (~800k€), recognizing scientific excellence, independence, and leadership. It funds my independent research and will support the establishment of my own research group. I contribute to the scientific community by organizing scientific workshops (COSYNE and Bernstein conference) and the Champalimaud Theory Seminar Series. I review for Nature Neuroscience, Journal of Neuroscience, Scientific Reports, COSYNE and NeurIPS. I support open science through code and preprints. I have lectured and taught reinforcement learning, neural dynamics, and dimensionality reduction at international programs including the Cajal Course, Neuromatch Academy, Janelia Theory Workshop, and NYU. As part of Neuromatch Academy, I taught a course that has reached over 10,000 participants from more than 140 countries. I founded the Women & Allies in Science initiative at Champalimaud and spoke at Soapbox Science Lisbon. Together, my work spans theory, modelling and experimental collaborations. I intend to develop my research line on hierarchical neural action representations and multiscale control of behaviour under the Ramón y Cajal program.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: SABATINI SABATINI, SERENA
Referencia: RYC2025-056675-I
Correo Electrónico: sabatiniserena@gmail.com
Título: Positive views on aging foster active and healthy aging

Resumen de la Memoria:

With my research, I aim to find strategies to promote health maintenance in older age because this would not only increase the quality of life of older people and their families, but also contain health and social care expenditure. I investigate whether and how individuals' views of their own aging influence their health. People with negative personal views on aging focus on age-related limitations and illnesses, whereas people with positive personal views on aging aim to make the most of ageing-related benefits such as having greater freedom. My PhD studies showed that older people with more negative personal views on aging have poorer physical, mental, and cognitive health. However, the causal relationship between personal views on aging and health remained unclear. Thanks to a UK ESRC postdoctoral fellowship I addressed this research gap. I found that, although people's personal views on aging and health changes have an impact on each other, people's personal views on aging had a greater impact on their health than the other way around. I then undertook additional analyses to understand why personal views on aging are such a strong predictor of older people's health. I found that people with negative personal views on aging are less likely to engage in healthy behaviors and this is one of the reasons why they are at risk of poorer health. So, targeting personal views on aging may benefit older people. In my subsequent roles I have showed that positive personal views on aging are beneficial also for people with chronic health conditions and their family caregivers. My finding that negative personal views on aging strongly contribute to poorer health is highly important given that globally 56% of older people are estimated to have negative views on aging. By reframing how such a big proportion of older adults perceive aging, the global number of health conditions could be significantly reduced. Researchers have shown that it is possible to promote more positive personal views on aging and, consequently, greater health, through interventions that promote physical activity and help older adults reframe their views on aging. However, the effects of these interventions fade over time. I hypothesize that the dwindling efficacy of these interventions is because they have been delivered at the individual level, but how older people perceive their aging is likely influenced by the beliefs that people close to them (e.g., spouse) have about aging, and by how they are perceived and treated by others. So, when it comes to changing how people view aging, we may need to target groups of individuals. I am addressing this hypothesis with a La Caixa Junior Leader Postdoctoral Fellowship focusing on the promotion of positive views on aging in older adult couples/spouses. Overall, so far, my research has focused on the impact of personal views on aging on individuals' health and on how we can promote more positive views on aging. With my future research, I want to identify groups of individuals at risk of negative personal views on aging and that would therefore benefit the most from interventions promoting positive views on aging. Guided by theoretical reasoning and preliminary evidence, I will start by investigating views on aging in menopausal women, healthcare professionals, and young adults who witness their parents caring for an older person.

Resumen del Currículum Vitae:

I investigate whether and how individuals' views of their own aging influence their behaviors and, ultimately, their health. During my PhD (University of Exeter) I have found that those individuals with more negative personal views on aging have poorer health. However, the causal relationship between views on aging and health remained unclear. I addressed this question thanks to an ESRC Postdoctoral Fellowship as PI (University of Nottingham). I have found that people's personal views on aging have a greater effect on their mental and physical health rather than the opposite. Moreover, people with negative personal views on aging are less likely to engage in healthy behaviors and this is one of the reasons why they experience poorer health. However, evidence on cognition was unclear. I have therefore obtained, as co-investigator, a British Academy/Leverhulme Small Research Grant (University of Surrey) that is allowing me to investigate whether negative personal views on aging act as a risk factor for cognitive decline. During my postdoctoral and lecturing positions, I have also showed that positive personal views on aging benefit people with progressive conditions like dementia and their caregivers (some of this work was done as co-PI on a UK Academy of Medical Sciences Networking Grant). Currently, as La Caixa Junior Leader Postdoctoral Fellow (University of Barcelona), I am investigating views on aging in older adult couples. My scientific contributions include 64 articles in peer-reviewed journals (38 as first author, 2 as last author, 55 in Q1 journals, 881 citations in google scholar), 14 under review, 1 book chapter, 1 publication in The Conversation, 6 first-author international conference proceedings, more than 25 conferences presentations, and 19 invited talks. I have collaborated with end-users and engaged in outreach activities including 10 talks at public festivals; featuring of my research in the news and podcasts; YouTube videos; and accessible summaries. Finally, I have undertaken 550 hours of teaching and have (co)supervised 6 undergraduate, 2 master's, and 5 PhD students. I have obtained funding as PI for 2 projects (ESRC and La Caixa fellowships), as co-PI for 1 project (Academy of Medical Sciences Networking Grant), and as co-investigator for 2 additional projects (British Academy/Leverhulme Small Research Grant; Australian Research Council Discovery Grant). I have received 3 awards and 4 travel and collaboration funds. I have a strong international network, fostered by my work experiences in 5 different universities across UK, Switzerland, and Spain and by 7 visits to international labs in Spain, Germany, Switzerland, Australia, and the US. In my research I have used different methodologies. I have analyzed 13 between cross-sectional and longitudinal quantitative datasets and 3 qualitative datasets. I have worked on 7 published reviews, including meta-analyses. I have collected new quantitative and qualitative data (e.g., during the Academy of Medical Sciences Networking Grant). Finally, during my La Caixa Fellowship I have been acquiring knowledge on randomized clinical trials. I am in the editorial board of three academic journals, and I have experience in co-editing special issues. I have been part of the University of Surrey ethics committee, and I have (co)organized monthly seminars, workshops, and symposia.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: ROMÁN CABALLERO, RAFAEL
Referencia: RYC2025-055142-I
Correo Electrónico: rarroca@ugr.es
Título: Music, Mind, and Development: Cognitive and Neural Mechanisms Shaped by Musical Experience
Resumen de la Memoria:

My research trajectory brings together lifelong musical training, Cognitive Psychology, and an interdisciplinary approach to understanding how musical experience shapes cognition across development. Early training as a violinist motivated my studies in Psychology at the University of Granada, where I began researching visual and social attention in Prof. Juan Lupiáñez's laboratory through two competitive research-initiation scholarships. This experience provided a strong methodological foundation in experimental design and attention research. I completed my PhD at the Mind, Brain, and Behaviour Research Centre (CIMCYC) with an FPU scholarship, where I established an independent research line on the cognitive impact of musical training, with a focus on attention and domain-general skills. My work integrated state-of-the-art analytical approaches, including meta-analysis, mixed-effects and Bayesian modelling, and advanced eye-tracking, and contributed to clarifying the robustness and mechanisms of cognitive benefits associated with music. Research stays with Prof. Laurel Trainor at McMaster University (Canada) further expanded my expertise in music cognition and developmental neuroscience, resulting in a long-term collaboration. I am currently a Marie Skłodowska-Curie Global Postdoctoral Fellow leading a cross-cultural project between McMaster University and the University of Granada on how musical skills and early musical interactions support infants' language and social development. This fellowship has strengthened both the international dimension of my work and my leadership in designing and coordinating longitudinal, multimethod research. My scientific production includes 23 indexed publications (~1,000 citations in Scholar; ~600 in Scopus; h-index 13), most in top-tier journals such as Nature Human Behaviour, Psychological Science, Neuroscience & Biobehavioral Reviews, and Advances in Methods and Practices in Psychological Science. My contributions extend beyond music cognition to meta-science and reproducibility, including participation in large multisite initiatives and methodological advances for evaluating robustness in behavioural research. Internationalization and collaboration are central to my trajectory. I have established active partnerships with research groups in Canada, Spain, Italy, France, and Portugal, participated in major multilab studies, and served as Intern Junior Editor at Journal of Experimental Psychology: Human Perception and Performance. My teaching experience includes courses in Experimental Psychology and the supervision of nearly 20 undergraduate projects across Granada and McMaster. Overall, my research programme seeks to understand how structured experiences, particularly musical training, shape cognitive and neural development, while advancing rigorous and transparent methodological standards in Psychology.

Resumen del Currículum Vitae:

My childhood and adolescence studying violin at the conservatory sparked my fascination with music and its influence on our social, emotional, and behavioural lives. This led me to pursue Psychology at the University of Granada, one of Spain's leading faculties, where I became involved in research even before starting my PhD. I worked on projects on social and visual attention in Prof. Juan Lupiáñez's lab, funded by two competitive initiation scholarships. I later obtained an FPU scholarship (one of Spain's most competitive doctoral scholarships) to complete my PhD at the Mind, Brain, and Behaviour Research Centre (CIMCYC). My doctoral research established an independent line that I continue developing today: understanding how musical training shapes cognition, particularly attention. The scholarship also enabled research stays with Prof. Laurel Trainor at the McMaster Institute for Music & the Mind@LIVELab (Canada), fostering a long-term collaboration on music cognition. I am currently conducting postdoctoral research through a Marie Skłodowska-Curie Global Fellowship, examining how musical skills and early musical interactions support infants' music and language development across McMaster University and the University of Granada. My scientific production includes 23 publications in indexed journals (~1,000 citations in Scholar; ~600 in Scopus; h-index 13, i10-index 17). Nineteen papers are in Q1-Q2 journals (82%), and eleven in top-decile journals (48%), including Nature Human Behaviour, Advances in Methods and Practices in Psychological Science, Neuroscience & Biobehavioral Reviews, and Psychological Science. Several works have achieved notable visibility, surpassing 100 citations, showing impact well above field averages (Field-Weighted Citation Impact ~2.5), and receiving coverage in general media. My research has clarified whether and how musical training produces neurocognitive benefits, particularly in domain-general skills such as attention, and has shown that attention can be shaped by training and by transcranial stimulation. My early work also demonstrated the privileged role of social cues in guiding attention. These contributions reflect close collaborations with international groups (e.g., Prof. Trainor; Prof. Vadillo; Prof. Mioni; Prof. Tillmann), participation in large multilab initiatives (e.g., Grassi et al., 2025), and the application of innovative analytical approaches. I have presented more than 30 communications at international conferences and participated in projects supported by six competitive grants (totalling €808,004.32). My teaching experience includes courses in the Department of Experimental Psychology and Universitat Oberta de Catalunya, and the supervision of 8 undergraduate theses in Granada and 11 research projects at McMaster, all with student evaluations above the university average. I have complemented my research with strong outreach activity, directing a one-year public engagement program funded by the Spanish Ministry of Science and Innovation (FECyT, €4,000) and coordinating monthly psychology talks in bars (PsychoBeers). I have also written numerous articles for general media and received outreach awards, including first prize in the Lilly Foundation@The Conversation dissemination contest.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: MARTÍNEZ PRADEDA, ÚRSULA
Referencia: RYC2025-054579-I
Correo Electrónico: mp.ursula@gmail.com
Título: Advancing Smoking Cessation Science in Vulnerable Populations

Resumen de la Memoria:

Broadly, my program of research focuses on developing and testing smoking cessation interventions for vulnerable populations, including cancer patients. Smoking after a diagnosis of cancer can significantly impair cancer treatment outcomes and survival, regardless of cancer type. However, only about a third of individuals who smoke quit at the time of diagnosis. In addition, existing evidence based smoking cessation treatments are highly underutilized by cancer patients. This affects especially those patients with cancers that are not typically perceived as smoking related, who tend to be unmotivated to quit. Findings from one of our studies indicated that patients with cancers other than thoracic or head and neck were less motivated to quit smoking, which was a predictor of continued smoking two months later. This was the foundation of my NCI-funded R03 as Principal Investigator (R03CA227044). As part of this project, we created a brief and easy to disseminate self-help intervention to increase motivation to quit smoking among patients with cancers that are not typically perceived as smoking related (i.e., breast, bladder, colorectal, gynecological, melanoma). This intervention was then distributed to 48 patients, demonstrating outstanding feasibility and acceptability results. As a next step in this line of research, I am currently leading as Principal Investigator an NCI K22 award (K22CA276255) to conduct a pilot randomized controlled trial in preparation for a fully powered clinical trial in which the intervention will be compared to usual care in promoting smoking abstinence through the engagement with evidence-based smoking cessation treatments.

When I moved to the United States, I became highly involved in the translation and cultural adaptation process of the evidence-based self-help Stop Smoking for Good intervention for Hispanic/Latino individuals who smoke. I then played a significant role on a large RCT (N=1,417) testing the newly created Spanish-language smoking cessation intervention. Additionally, I expanded my research interests by engaging in an innovative study that developed the first intervention focused on dual users of combustible and electronic cigarettes to help them completely quit smoking. I had the opportunity to lead the large nationwide 3-arm RCT (N=2,898) that tested the efficacy of this intervention. I have recently merged these two lines of research on a project that was funded by the Cancer Control and Population Sciences at the Huntsman Cancer Institute to create and pilot test a culturally relevant intervention to promote the complete switch from combustible cigarettes to e-cigarettes among Hispanic/Latino individuals who failed to quit smoking using FDA approved smoking cessation treatments.

As part of the Ramon y Cajal program, I propose to adapt the Programa para Dejar de Fumar, an evidenced based smoking cessation program for the general population in Spain, for use with cancer patients. My growing research trajectory together with my extensive experience in intervention development using the proposed methodology as well as my work with oncological populations demonstrate my strong skills for the successful execution of this project.

Resumen del Currículum Vitae:

I received my PhD in Clinical Psychology and Psychobiology from the University of Santiago de Compostela in 2015, focused on tobacco cessation and mental health. By the end of my PhD training, I obtained funding from Fundacion Barrie to visit the Calvary Matter Hospital at the University of Newcastle (Australia) for 6 months, where my interest expanded to smoking cessation among cancer patients. In 2016, I joined Moffitt Cancer Center as an R25-funded postdoctoral fellow in Behavioral Oncology. After 2 years, I was promoted to an Applied Research Scientist position in 2019, and in 2022, I obtained the Research Instructor designation, which gave me protected time to develop my own line of research. I also held a courtesy appointment as an Assistant Professor at the University of South Florida between 2020 and 2023. In 2024, I transitioned to the University of Utah as an Assistant Professor in the tenure track in the Department of Family and Preventive Medicine at the School of Medicine. To date, my scientific productivity includes 51 peer-reviewed publications (10 as first author) in high-impact journals such as Lancet Public Health, Psycho-Oncology, and Nicotine & Tobacco Research. My work has over 1,500 citations, and my h-index is 22 according to Google Scholar. I have been invited to present my work in national and international conferences with more than 100 posters, oral communications, and invited talks. I have secured over \$1 Million in research funding both in Spain and the United States. I have contributed to 20 research projects (4 as Principal Investigator), and I serve on the editorial boards of the Journal of Addictive Diseases and Health Psychology Research. I also review internal grant applications regularly at the Huntsman Cancer Institute and within my Department. In 2024, I served as a reviewer for the National Health Institutes Interventions to Prevent and Treat Addictions (IPTA) Study Section. I also have an extensive mentoring experience, including with trainees that identify as an underrepresented minority in the biomedical workforce through the REACH-U2 summer program. Within my Department, I am a co-leader of the CHAIN program, which supports Public Health graduate students in gaining research experience in Family and Community Medicine. I also mentor a student in the Master's of Public Health on their Master's thesis, which will be defended in May 2026. Additional accomplishments include my habilitation as Psicóloga General Sanitaria in Spain (2015) and as Profesor Ayudante Doctor by ANECA.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Psicología

Nombre:

PRETUS GÓMEZ, CLARA

Referencia:

RYC2025-054948-I

Correo Electrónico:

clara.pretus@gmail.com

Título:

The Psychology of Entitlement: How Perceived Rights Fuel Radicalism

Resumen de la Memoria:

I am a Serra Hùnter Professor at the Universitat Autònoma de Barcelona and a research affiliate at the Hospital del Mar Research Institute. I have contributed to understanding political extremism from a neuroscience standpoint: I have described the neural underpinnings of “will to fight” in jihadist militants and how these neural correlates are modulated by social exclusion in youth vulnerable to radicalization. I have also revealed how extremism predicts sharing of political misinformation online and resistance to fact-checking and have developed pioneering interventions to address this issue.

My trajectory attests to my capacity to generate new ideas, define research programs, and secure research funds. I have contributed to coordinating two European projects, one of them at a PI level at my institution, where I am responsible for budget management, recruitment of students and research assistants, supervising project development, and creating synergies with the other project partners and stakeholders. I have been awarded nationally and internationally competitive research grants (Generación de Conocimiento 2023 and BIAL Foundation 2023), which I lead as a Principal Investigator. These experiences have consolidated my leadership skills.

I have an extensive network of international collaborations, which resulted in part from my two-year research visit to New York University, and my three-month visits to the University of California, Berkeley, and the Humboldt Universität zu Berlin. I am currently part of several international research consortiums, including two European and two international consortiums that gather researchers from over 70 countries with the goal of addressing global challenges (e.g., Center of Conflict Studies and Field Research at Artis Intentional). These networks have allowed me to conduct cutting-edge research while working toward cross-cultural validation and inclusive science.

I have disseminated my research widely among the scientific community and among policymakers, diplomats, and national security bodies (e.g., Air Force Academy, United Nations Department of Peace and Security). My work on violent extremism has been cited in major policy speeches, has been by TIME Magazine, The New York Times, and The Conversation, and has been featured on the Netflix show “The Mind, Explained”. I also share my research through knowledge-transfer activities. I have served at the United Nations International Hub on Behavioral Insights to Counter Terrorism, a Training and Capacity Building program of the UN Office of Counter Terrorism, where I have provided training and mentoring to practitioners, UN program managers, civil society organizations, and member state government officials in charge of counter-terrorism programs.

Finally, I am devoted to helping others consolidate their scientific skills. I have mentored and supervised several master’s and undergraduate students over the last years, and I am the direct supervisor of four Ph.D. candidates who conduct studies in Neuroscience and Neuropsychology. Three of my previous students have defended their dissertation with the highest distinction (08/09/2022, 26/05/2025, 06/06/2025).

Overall, my trajectory demonstrates my capacity to produce cutting-edge science, lead multi-lab international collaborations, engage with project stakeholders, and serve the scientific community.

Resumen del Currículum Vitae:

My research integrates social and political psychology to understand the psychological drivers of radicalism, political violence, and polarization. I examine how experiences of intergroup exclusion and perceived injustice shape individuals’ support for extremism, using experimental methods and novel tools such as the RateME paradigm to capture causal mechanisms. Our recent work suggests that vicarious intergroup rejection “or witnessing the rejection of a group one is not a member of (e.g., Palestine)” directly increases radicalism among individuals who feel fused with the group. Unlike excluding one’s own group (which affected radicalism only indirectly), vicarious intergroup rejection did not undermine participant’s sense of agency, paving the way for the observed increases in radicalism. Notably, these effects were not only observed among fused individuals, in line with previous literature (Gómez et al., 2011), but also among individuals who reported high levels of interpersonal entitlement.

Building on these findings, my current research focuses on psychological entitlement as a central mechanism linking interpersonal expectations to political extremism. I study how feelings of being owed specific forms of treatment, access to social resources (e.g., power, recognition, and status), and perceived rights over others’ behavior contribute to moral absolutism, hostility, and justification of violence. This work connects individual-level interpersonal processes with group-level political conflict, offering a unified framework for understanding how everyday social expectations escalate into radical political attitudes.

In the proposed line of research, my goal is to systematically identify the cognitive and motivational mechanisms through which entitlement shapes radicalism across different ideological contexts. I will test the generalizability of these processes across political issues, group identities, and cultures, and I will develop experimentally validated interventions to reduce entitlement-driven hostility. These interventions will target entitlement-based narratives, moral reframing, and procedural justice perceptions to weaken the escalation from grievance to political violence.

This research contributes to social psychology, political psychology, and behavioral science by integrating theories of entitlement with models of extremism and intergroup conflict. Methodologically, it advances experimental approaches to studying radicalization in ethically responsible ways and generates open, reusable tools for the scientific community, such as RateME. At the societal level, the work aims to inform prevention and



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

deradicalization efforts, strengthen early-warning systems, and support initiatives in countering violent extremism and promoting social cohesion by addressing the interpersonal roots of political violence.

In sum, my research seeks to explain and reduce political radicalism by uncovering how entitlement, exclusion, and group identification shape support for violence, and by translating these insights into scalable, evidence-based interventions.



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Y UNIVERSIDADES



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: BIRBA, AGUSTINA
Referencia: RYC2025-055881-I
Correo Electrónico: Agustina.birba@gmail.com
Título: Brain mechanisms of embodied cognition: Insights from health to neurodegeneration

Resumen de la Memoria:

Throughout my academic career, I have built a robust and internationally oriented research trajectory focused on understanding the neural bases of language, social cognition, and neurodegeneration. My work integrates embodied cognition, naturalistic neurolinguistics, and multimodal neuroimaging to reveal how motor, sensory, and interoceptive systems shape discourse-level comprehension in both healthy and clinical populations. Through EEG, iEEG, MRI, fMRI, and advanced analytical methods, I have demonstrated how linguistic experiences, motor-system dynamics, and embodied mechanisms contribute to real-world language processing, and how their disruption characterizes Alzheimer's disease, Parkinson's disease, frontotemporal dementia, and socio-cognitive conditions such as autistic traits and PTSD. This line of research has established ecological language comprehension as a sensitive, disease-specific window into neurocognitive functioning.

In parallel, I have advanced a second major research line leveraging non-invasive and intracranial brain stimulation to improve cognitive and linguistic processes in vulnerable populations. My studies have shown how parietal cortex stimulation modulates working memory, how neuromodulation can selectively enhance action-semantic processing in Parkinson's disease, and how stimulation-induced changes reveal mechanistic insights into brain-behavior relationships. Together, these contributions demonstrate the translational potential of neuromodulation for developing targeted, personalized interventions.

Across these lines, my work has progressively converged toward the development of naturalistic, scalable linguistic biomarkers for early detection of neurodegenerative diseases—an agenda I now lead through multiple international collaborations. As EEG Team Leader at IUNE (Spain) and recently at the Cognitive Neuroscience Center of the University of San Andrés (Argentina), I coordinate multidisciplinary teams and large-scale EEG projects. My leadership is further strengthened by securing competitive funding, mentoring PhD students, and overseeing data governance for the Include Network. Currently, I hold two prestigious postdoctoral fellowships: one at UCSF (USA) within an NIA-NIH program on frontotemporal dementia led by Prof. Maria Luisa Gorno Tempini, and another in the LiMoN-2 project, a Swiss National Science Foundation initiative involving the University of Geneva, Catholic University San Pablo (Perú), and University of San Andrés (Argentina). These fellowships expand my expertise in multimodal biomarkers and cross-linguistic neurolinguistics in bilingual populations.

Overall, my trajectory reflects a sustained commitment to theoretical innovation, methodological rigor, and clinical relevance. I aim to pioneer the integration of natural speech and comprehension markers with machine learning and multimodal neuroimaging, contributing to early diagnosis, personalized interventions, and improved quality of life for individuals with neurodegenerative diseases.

Resumen del Currículum Vitae:

Dr. Agustina Birba obtained her PhD in 2021 from the University of Buenos Aires, Argentina, where she specialized in cognitive neuroscience, neurolinguistics, and advanced neuroimaging techniques (EEG, MRI). During a research internship under the mentorship of Dr. Manuel de Vega at the NeuroCog Lab in Spain, she developed expertise in non-invasive brain stimulation methods (TMS, tDCS). Her research investigates the neuropsychological, neurophysiological, and neuroanatomical bases of language and social cognition in healthy individuals and clinical populations with neurodegenerative and neuropsychiatric disorders. Following her PhD, Dr. Birba was awarded a Takeda Pharmaceuticals grant to conduct postdoctoral research at the BrainLat Institute in Chile. In 2023, she joined the Instituto Universitario de Neurociencias (IUNE) at La Laguna University as a Juan de la Cierva fellow, where she leads the EEG research team. At IUNE, she directs a major research program funded by a La Caixa-Caja Canarias Grant (2023DIG21, 2024-2027) focused on natural language markers of neurodegeneration. She also collaborated through the National Foreign Expert Program with the University of Electronic Science and Technology of China (UESTC). She currently holds two additional competitive international postdoctoral fellows (2025-2028): one within the NIA-NIH project Frontotemporal Dementia: Genes, Images, and Emotions (Ref. 2P01AG019724-21A1), and another as part of LiMoN-2: Linguistic Markers of Neurodegeneration in Bilinguals, funded by the Swiss National Science Foundation (Ref. 223316).

Dr. Birba teaches in the Behavioral Sciences undergraduate program at the University of San Andrés (Argentina), the Master's in Social Neuroscience at ICESI University (Colombia), the Master's in Language and Cognition at the National University of Cuyo (Argentina), and graduate programs at La Laguna University (Spain), where she lectures on neurocognitive research methods, psycholinguistics, and language processing. She has authored over 50 publications—including book chapters and articles in leading journals such as Biological Psychiatry, Nature Medicine, Scientific Reports, Neuroscience and Biobehavioral Reviews, Neurolmage, and Brain. Her research has been cited more than 1,000 times (H-index = 24, Google Scholar) and involves collaborations with over 50 co-authors across multiple countries, disciplines, and research institutions.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Psicología

Nombre:

ABDELHACK , MOHAMED

Referencia:

RYC2025-054711-I

Correo Electrónico:

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Título:

Integrative modeling of neurocognitive circuits across mental disorder symptoms

Resumen de la Memoria:

I will study neural pathways from those responsible for sensory perception to cognitive decision-making. Specifically, I will focus on discovering and characterizing their alterations in across the mental health spectrum, using a combination of data-driven approaches and computational and AI-based modeling. This work will aim to 1) improve models of mental wellbeing for use in diagnostic and prognostic applications, 2) provide mechanistic explanations for problematic behaviors and symptoms that could be targeted with interventions and lifestyle changes, and 3) translate existing information processing-based theories of cognition to objective biological measurements in humans.

This line of research will depend on processing both large datasets of the general population and small clinical cohorts, both of which I have expertise in. I have experience with collecting fMRI data, and building pipelines to process large amounts of data using high performance computing (such as UK Biobank, ACTFAST, and Human Connectome Project). I am expecting the outcome of my research to cause a paradigm shift at the interface of the fields of NeuroAI and neuropsychiatry. This approach can solve the question of the symptom sharing across different disorders and the high rates of psychiatric comorbidity. It will benefit the field of precision medicine where interventions can be tailored based on the phenotype profile of each patient to maximize the benefit and minimize the harmful side effects.

During my Ph.D., I studied how top-down pathways improve the visual processing of blurred images revealing a sharpening mechanism. Using brain decoding and deep neural networks, I found that neural representations of blurred images were sharper than if processed by purely a bottom-up mechanism. This work sparked an ongoing clinical collaboration to study top-down sharpening in schizophrenia. By comparing the degree of sharpening in schizophrenia patients with controls, I revealed an elevated top-down effect in the patient group. This project is currently ongoing where I am investigating which top-down processes are affected and integrating high cognitive processes impaired in schizophrenia.

After my Ph.D., I took a more integrative path to investigate the relationships between different phenotypes of sleep duration, insomnia, narcolepsy, depression, and cognition in task and resting state conditions. I calculated how brain-wide associations of these phenotypes covaried in large populations. This work revealed opposing neural signatures between task and resting-state conditions. Resting-state signal revealed a counterintuitive pattern where the brain-wide associations of insomnia and depression correlated positively with that of very long sleep duration. They also revealed patterns of hyperconnectivity in resting-state condition but hypoconnectivity in task condition. I am currently following up on this work studying longitudinal pathways to reveal causal effects between the different phenotypes of sleep and depression with their neural signatures. I am also building models that integrate neural firing patterns and metabolic processing to uncover the interplay between cognitive processing and metabolic load.

Resumen del Currículum Vitae:

I work at the intersection of computational and cognitive neuroscience, artificial intelligence, data analytics, and psychiatry to unravel the neural underpinnings of perception, cognition, and mental health and how they relate to physical health. My research leverages deep learning and advanced data analytics to build integrative models of brain function. I developed a unique set of global experiences and strong academic networks from working in Africa, the Middle East, Japan, the United States, and Canada in addition to global collaborations.

I have published 19 papers (five first-authored), three papers are under review, and three more first-authored papers are under preparation. I have also given 23 invited talks (one keynote), one plenary, one Rising Stars Showcase, and nine oral and 19 poster presentations. I have a successful track record of obtaining research funding during my doctoral and postdoctoral training such as the Japanese government scholarship, CAMH womenmind, and Discovery Fund postdoctoral fellowships, and Canadian Neuroanalytics Scholars Program in addition to being a co-PI on a Canadian Institute of Health Research (CIHR) Project Grant (totalling over 800k euro equivalent). This is in addition to multiple teaching grants for the organization I founded (Arabs in Neuroscience) from the International Brain Research Organization (IBRO) and Simons Foundation totalling over 50k USD. I was recognized in 2025 by The Transmitter publication as one of 25 Rising Stars in Neuroscience. I have multiple travel and other awards from IBRO, CIHR, Society for Biological Psychiatry, and the University of Toronto.

I did my doctoral studies at Kyoto University, Japan, where I used deep learning models to uncover a top-down sharpening mechanism in the human visual cortex in response to degraded visual input. I worked as a postdoctoral scientist at Washington University in St. Louis at the intersection of the Departments of Anesthesiology and Computer Science using AI and data analytics to improve healthcare (deployed an AI surgeon-assistance system at the Barnes Jewish Hospital). I am currently a postdoctoral fellow at the Centre for Addiction and Mental Health, a research hospital affiliated with the University of Toronto. By processing brain activation data from over 30,000 participants from the UK Biobank and Human Connectome Project, I uncovered unusual brain activation pattern associations of insomnia, depressive symptoms and sleep duration. This work was published in Nature Communications, received the Canada Brain Star Award, and was selected for a plenary talk at the University of Toronto's Department of Psychiatry Research Day in 2024. This paper was also recognized by the journal as among the top 25 downloaded articles in 2023.

Open science is a priority to me where I release all my teaching materials online. I have gained extensive teaching experience in summer schools such as Neuromatch Academy, Imbizo, and the KCNI Summer Academy over the last six years. Through, Arabs in Neuroscience initiative and designed, organized, and taught multiple schools online and in-person that have trained over 400 students and released many hours of materials to the open-



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

source space. In recognition of these values, I was awarded The Neuro@Irv and Helga Cooper Foundation Open Science International Trainee Prize in 2024.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática:

Psicología

Nombre:

DE SANCRISTÓBAL ALONSO, BELÉN

Referencia:

RYC2025-055426-I

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Título:

Computational and Experimental Approaches to Sensory Processing: Brain States and Individual Differences

Resumen de la Memoria:

My research investigates how brain dynamics shape sensory processing through computational modeling integrated with experimental approaches, progressively establishing principles of neuronal communication and linking brain dynamics to behavior.

Scientific Trajectory

My doctoral research established fundamental mechanisms of neuronal communication through oscillations. I demonstrated that subthreshold oscillations act as frequency-selective filters and that precise frequency alignment—not just phase coherence—is essential for effective communication, critically assessing the limitations of the "Communication Through Coherence" hypothesis. This culminated in showing how noise optimizes collective cortical coherence through stochastic resonance (Nature Physics, FWCI=1.56), bridging computational predictions with experimental validation at IDIBAPS.

My postdoctoral work expanded to systems-level questions about alterations in endogenous rhythms and individual variability in rodent and human neuroscience. Combining LFP/EEG recordings with computational modeling of resting-state fluctuations, I revealed that (1) impaired gamma oscillations could be explained by decreased inhibitory connections and (2) individuals with slower temporal dynamics exhibit enhanced sensory responsiveness and faster reaction times (Brain Topography, FWCI=1.23), establishing correlations between intrinsic dynamics and motor response.

As PI of the NAPS project, I addressed how sleep-wake transitions regulate information propagation across cortical networks. Integrating computational modeling with multi-site recordings from freely moving rats, I introduced the spatial homeostasis hypothesis—that distance-selective synaptic upscaling during wake transitions enhances long-range communication (PLoS Computational Biology 2025).

Line of Research to be Developed

My research program will establish causal mechanisms by which brain dynamics shape sensory-motor processing across states and individuals, advancing from correlation to prediction, local circuits to whole-brain networks, and electrical to integrated neuromodulatory mechanisms.

Research Line 1: Sensory Processing Across Sleep-Wake Cycles. I will implement large-scale mean-field models incorporating realistic connectivity and neuromodulatory variables, testing brain states regulate information propagation. Analyzing multi-site rodent and human intracranial recordings will validate predictions about state-dependent connectivity and evoked responses.

Research Line 2: Individual Variability in Sensory-Motor Processing. I will develop drift-diffusion models constrained by neural recordings to predict reaction time distributions, establishing causal links between cortical dynamics and motor output. Testing the temporal scale hypothesis—that stimulus-brain dynamic mismatches determine performance variability—through varied stimulus durations will reveal principles of sensory-motor integration with implications for cognitive decline.

These objectives leverage existing datasets, established collaborations (IDIBAPS, UVic-UCC, UPC, HSJD), and demonstrated capacity for independent research. Expected impact includes establishing principles for state-dependent processing applicable beyond sleep, frameworks linking intrinsic dynamics to cognitive performance, and potential biomarkers for cognitive decline detection.

Resumen del Currículum Vitae:

I study brain dynamics, sensory processing, and neuronal communication, demonstrating progressive independence, international collaboration, and integration of theoretical modeling with experimental neuroscience.

Research Output and Impact

I have published 13 peer-reviewed papers (11 in Q1 journals), including publications in Nature Physics and Brain Topography. My doctoral work on neuronal communication accumulated 125 citations and received the Best Oral Communication award at NOLTA 2012. I have received positive sexenio assessment (2009-2014) from AQU Catalunya. I maintain strong open science practices with six open-access publications and public code repositories (Zenodo). My research has received media coverage in national newspapers and radio interviews.

Funding and Project Leadership

As PI, I obtained Junior Leader "la Caixa" Fellowship, Juan de la Cierva-Incoming Fellowship, University Medical Research Fund Canada, and Torres Quevedo grant for industrial R&D. During my PhD, I was funded by a competitive FPU fellowship. I have participated in 9 research projects, progressively assuming greater responsibility from team member to PI.

Independence and Leadership

As PI of the NAPS project, I reached research independence: designing experimental protocols including automatic sleep-wake classification and auditory delivery systems, obtaining animal experimentation certification, directly supervising one PhD student, establishing inter-institutional collaborations, and producing two last-author publications. I mentored junior PhD students during my doctorate and became the first computational member of an experimental lab (CRG), successfully bridging theoretical and experimental communities. I have served on multiple PhD, master's, and bachelor's evaluation committees and co-organized the BARCCSYN conference.

International Experience and Collaboration

I conducted annual research stays at Max Planck Institute for Brain Research (Frankfurt). My postdoctoral training in Ottawa secured independent funding and established lasting collaborations. I obtained International Doctorate mention from UPC. I have presented at premier international conferences with invited talks demonstrating cross-disciplinary recognition. I maintain active collaborations with research groups in Spain (IDIBAPS, UVic-UCC, UPC, HSJD), Canada (University of Ottawa), and UK (Imperial College London).

Teaching and Training

Between 2021-2025, I held a full-time teaching position at ELISAVA Barcelona School of Design (420 hours/year) while serving as International Mobility Coordinator (80 hours/year), managing exchanges with 20+ international institutions. I coordinated Physics, Mathematics, and Statistics courses and



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

supervised 5 industry internships annually. I have taught in CRG/UPF master's programs and supervised undergraduate/master's students across diverse disciplines (computer engineering, bioinformatics, mechatronics, industrial design, medicine). I co-organized the NeuroUnconference during Brain Awareness Week.

Technology Transfer

My Torres Quevedo grant with BrainFocus Labs demonstrates technological transfer capacity, developing algorithms for stereo-EEG analysis in epilepsy patients for diagnosis and pre-surgical evaluation. I currently collaborate with Hospital Sant Joan de Déu's Epilepsy Unit analyzing pediatric patient data.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: ANTUNES LIMA, RODRIGO
Referencia: RYC2025-057248-I
Correo Electrónico: rodrigoantlima@gmail.com
Título: Promotion of Mental Health Among Youth

Resumen de la Memoria:

Rodrigo Antunes Lima, Ph.D., has an outstanding international insertion. He conducted his PhD studies in Health Sciences at the University of Southern Denmark after his Bachelor and Master's in Brazil. In total, Dr. Lima has more than eight years as a postdoctoral researcher, summing the positions in Brazil, Austria and Spain.

Dr. Lima aims to advance his research line on youth mental health promotion by developing, adapting, testing, and implementing scalable programmes that can be integrated into educational and health-care systems in Catalonia, Spain, Europe, and worldwide.

A key priority is ensuring the sustainable continuation of the two EU-funded projects in which he plays a major role (ePro-Schools and IMPROVA). He will focus on completing the intellectual property and market analysis work required to establish a spin-off, which is the likely pathway for the long-term management of both programmes. Through this structure, he would lead their ongoing refinement and broader implementation across countries and socioeconomic contexts.

In addition, Dr. Lima plans to develop, test, and implement targeted interventions focused on promoting mental health and preventing mental disorders in youth. One major goal is to secure funding to develop and evaluate a comprehensive, school-integrated programme that screens and provides effective treatment for anxiety and depression among adolescents. This initiative would complement the universal components of ePro-Schools and IMPROVA with online treatment for adolescents at higher risk. Dr. Lima is the PI of a related proposal under evaluation by the Wellcome Trust Foundation, potential funding of £9 million.

He also envisions innovative projects building on his expertise in psychology and exercise, including the development and testing of an exercise and behaviour-change programme to reduce anxiety and depressive symptoms among young people receiving psychotherapy. In parallel, the research line will expand its international reach by strengthening engagement with the SMHILE network and other global initiatives. Dr. Lima will encourage his team's participation to reinforce the group's international profile.

Altogether, this research line has the potential to transform youth mental health promotion. By creating scalable, evidence-based programmes integrated into schools and primary care, it addresses a critical public-health priority in Catalonia, Spain, and Europe. Combining universal prevention, targeted interventions, and digital therapeutic tools, the programme aims to meaningfully reduce the onset of mental health problems among adolescents. The development of translational pathways, IP generation, spin-off creation, and partnerships with educational and health authorities will further support real-world adoption, sustainability, and socioeconomic impact.

Beyond public-health outcomes, the research line will consolidate an internationally competitive programme with strong multidisciplinary and cross-sector collaborations. Its integration within European and international networks will strengthen Spain's leadership in youth mental-health innovation and advance scientific knowledge on prevention, implementation science, and digital mental-health solutions. This work will expand Dr. Lima's trajectory from programme development and evaluation toward large-scale implementation and system-level impact

Resumen del Currículum Vitae:

Rodrigo A. Lima, Ph.D., is a researcher at the Fundació Privada per a la Recerca i la Docència Sant Joan de Déu (FSJD) in Spain and a member of the Centre for Biomedical Network Research on Mental Health (CIBERSAM). Trained in physical education with a PhD in Health Sciences (University of Southern Denmark), his work focuses on promoting mental health and preventing mental health problems in children and adolescents, with particular emphasis on designing and implementing scalable interventions.

At FSJD, Dr. Lima coordinates the Promotion of Mental Health Among Youth research line within the Impact and Prevention of Mental Disorders Group. Since June 2021, he has secured over £9 million in competitive research grants and fellowships, including two EU-funded projects (HORIZON and ERA4Health), a Marie Skłodowska-Curie Seal of Excellence Fellowship, and multiple national and international awards.

He is Principal Investigator of the ePro-Schools Project (GA 101095426), a school-based eHealth programme co-created to promote healthy lifestyle behaviours and support physical and mental health among adolescents in socioeconomically disadvantaged areas. Delivered through a digital platform with interactive modules for students, pedagogical resources for teachers, and materials for parents and school staff, the programme is designed for use both within and outside school. The program is currently being evaluated in a randomised controlled trial using implementation science to identify scalable strategies and guide evidence-based practice and policy.

Dr. Lima is also scientific coordinator and co-applicant of the IMPROVA Project (European Commission: 101080934), a large EU initiative that co-creates, implements, evaluates, and supports the scaling of a modular eHealth platform to promote adolescent mental health, support early detection, and prevent common mental health problems. Implemented in 51 secondary schools in France, Germany, Romania, and Spain and involving over 6,000 adolescents, IMPROVA includes comprehensive evaluation and co-development of scale-up guidance with adolescents, families, school communities, and policymakers.

He serves as the Spanish representative in the School Mental Health International Leadership Exchange (SMHILE), contributing to global discussions on school mental health policy and evidence-based practice. Dr. Lima has delivered talks, keynotes, and panels at international scientific meetings, policy events, and specialised symposia round the globe, and has participated in interviews and podcasts to raise awareness of youth mental health and lifestyle-health research.

He serves as an editorial board member of BMC Public Health and the Journal of Physical Activity and Health, and has peer reviewed for numerous high-impact journals, including NPJ Digital Medicine, British Journal of Psychiatry Open, Sports Medicine, JAMA Network Open, among others.

Dr. Lima has authored 63 peer-reviewed publications indexed in Scopus, with 1,027 citations and an H-index of 18. He has co-directed one completed PhD thesis and currently supervises another. He is formally affiliated as a PhD supervisor at the University of Barcelona (UB) and the Autonomous University of Barcelona (UAB), and serves as a Visiting Professor in the Post-Graduate Program in Hebiatrics at the University of Pernambuco.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: BEIRAN AMIGO, MANUEL
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Título: Structure and dynamics of recurrent neural networks: from connectomics to neural activity and behavior
Resumen de la Memoria:

My research trajectory centers on understanding how neural circuit structure shapes dynamics and behavior, using theoretical models tightly integrated with experimental data. Early work explored how biophysical mechanisms and population heterogeneity constrain neural coding and network timescales, showing the limits of single-neuron processes such as adaptation for generating behaviorally relevant dynamics. I also contributed to studies linking perceptual biases to dopaminergic activity and later to prefrontal cortical representations in decision-making tasks.

During my PhD, I developed the mathematical foundations of low-rank recurrent networks, proving their universality and demonstrating how population structure expands their computational repertoire. This framework has become a leading theoretical tool for explaining low-dimensional dynamics. I then applied it to primate electrophysiology, showing that low-rank constrained networks solve flexible timing tasks and generalize like monkeys, and that their latent geometry matches manifold structure in frontal cortex. This established my ability to connect mathematical theory, trained RNNs, and circuit-level interpretations of neural data.

As a postdoctoral researcher at Columbia University, I advanced two major research lines. First, I co-led the development of the first theoretical framework showing when connectomes can predict neural activity despite missing biophysical parameters. We demonstrated that structural wiring, combined with partial neural recordings, enables accurate predictions of unobserved neurons, validating this principle across *Drosophila* and zebrafish datasets. This work provides a foundation for incorporating emerging vertebrate-scale connectomes into mechanistic models. Second, I led an independent program on multi-region interactions, revealing how inter-areal bottlenecks shape distributed dynamics and showing that multi-area activity can be summarized by a compact tensor of region-interaction statistics. Applying these insights to data-driven RNNs trained on cortical recordings, I identified mechanisms underlying adaptive responses and large-scale circuit reorganization.

My future research aims to build a theoretical framework capable of extracting functional principles directly from connectomes. I will develop methods to identify functional neural assemblies by jointly leveraging structural and physiological data, addressing a key gap between invertebrate and emerging vertebrate connectomes. I will generate testable predictions in organisms with whole-brain datasets such as larval zebrafish and mouse, focusing on systems including motor programs, head-direction circuits, and navigation. A further goal is to explain how specialized neural populations emerge and support distributed computation across regions. Ultimately, my long-term vision is to unify structural and dynamical modeling to reveal general principles of neural computation.

Resumen del Currículum Vitae:

I studied a Bachelor in Physics (UAM, 2014), supported by multiple Prizes to Academic Excellence of the Comunidad de Madrid (2010-2012). During my studies, a DAAD fellowship introduced me to biophysics in Prof. Frank Jülicher's lab (MPI Dresden), where I contributed to a publication (Werner et al. 2015). I later worked in computational neuroscience with Prof. Nestor Parga (UAM) on Bayesian behavioral models of decision making, leading to an initial publication (Sarno et al. 2022) and forming the basis for subsequent work by graduate student Luis Serrano-Fernández, whom I co-mentored (Serrano-Fernández et al. 2024a,b). I then pursued an M.Sc. in Computational Neuroscience at the Bernstein Center Berlin (Humboldt/TU Berlin, 2016, Fundación Mutua Madrileña). My thesis with Prof. Benjamin Lindner studied how neural circuit heterogeneity shapes signal transmission (Beiran et al. 2016). I received the Ehrenpreis of the Technical University as the top student of the program.

In 2016, I began a PhD in cognitive sciences in Prof. Srdjan Ostojic's lab, supported by a LaCaixa postgraduate fellowship and the Ecole de Neuroscience de Paris. I investigated how neuronal networks perform temporal tasks. First, I analyzed mean-field models with slow biophysical processes and showed their limitations for generating task-related dynamics (Beiran et al. 2016). I then developed the low-rank theory of neural networks, now a standard model for explaining low-dimensional neural computations, proving their universality (Beiran et al. 2021) and applying the framework to diverse experimental tasks (Dubreuil et al. 2022). With Prof. Mehrdad Jazayeri (MIT), I built low-rank networks that reproduce monkey timing behavior and neural activity (Beiran et al. 2023), a study selected as a 2023 Highlight by the French Society for Neuroscience. I presented widely, taught Methods in Computational Neuroscience (Cogmaster, ENS 2018-2020), attended the Woods Hole summer school (MBL award), and organized a workshop at the Bernstein Conference (2020).

In 2021, I began a postdoc with Prof. Ashok Litwin-Kumar at Columbia University, aiming to integrate whole-brain connectomics with recurrent neural networks. This work culminated in a study establishing when connectomic data can drive accurate neural predictions (Beiran & Litwin-Kumar, 2025). In parallel, I led a project with PhD student David G. Clark on how multi-region circuit structure shapes emergent dynamics, resulting in my first last-author publication (Clark & Beiran, 2025). I also mentored undergraduate Arjun Dibya Sarker (Simons Foundation), whose work was presented at SURFIN (2024, 2025) and ABRCMS (2025). I expanded collaborations with theorists such as Prof. Kanaka Rajan (Harvard) and experimentalists like Prof. Mark Histed, contributing to data-driven studies (Akitake et al. 2023). I gave invited talks in the U.S. and Europe: Santa Fe Institute, COSYNE 2022, NIH, Bocconi, VVTN and organized the 2023 Kavli Seminar for Theoretical Neuroscience at Columbia.

Since 2019, I have served as a reviewer for leading journals and conferences (Nature Neuroscience, eLife, Physical Review, PLoS Computational Biology, COSYNE) and participated in outreach activities including Germany's Long Night of Science, France's Déclics program, and Columbia's Late Night Science talks.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Psicología
Nombre: PARÉS PUJOLRÀS, ELISABET
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Título: Neuroscience of voluntary action control

Resumen de la Memoria:

My research lies at the interface between perceptual decision-making and voluntary action control: I am interested in the neural mechanisms that allow people to adaptively tune their decision-making strategies in order to control their actions and achieve their goals. During my LaCaixa-funded PhD with Prof. Haggard at UCL (UK), I investigated the relationship between motor preparation signals and the subjective experience of intention focussing on simple, spontaneous actions. Using novel experimental paradigms and electroencephalography (EEG) experiments, my PhD work identified distinct links between specific motor preparation signals and conscious experience, and it established new methodological approach based on prospective probing in the field. My work was published in 3 peer-reviewed papers and it was awarded the William James Prize by the Association for the Scientific Study of Consciousness on 2023. While my PhD research focussed on simple spontaneous actions, controlling complex behaviour requires understanding how perceptual decision-making circuits interact with motor preparation ones in more realistic scenarios where actions are based on external evidence. Thus, during my postdoc at UCL, I developed a series of perceptual decision-making experiments where participants made decisions about discrete visual stimuli, but tasks retained a key elements of voluntary action. The use of novel, categorical visual stimuli allowed me to identify, for the first time, neural markers of choice formation and changes of mind in prominent human neural decision signals, leading to the publication of two papers and two book chapters. My growing interest in perceptual decision-making led me to join Prof. Kelly's lab at UCD (Ireland), a world-leading expert in the topic, where I have acquired advanced computational modelling and analysis skills that have brought my research toolkit beyond conventional methods. Combining computational modelling with neuroimaging techniques and powerful single-trial-based regression analysis tools, I have been able to precisely characterize how seemingly redundant signals across the sensorimotor hierarchy encode distinct computations during perceptual decision making. This work has been published in 3 peer-reviewed articles so far, with 3 more in preparation. Through my current position, I have also had the unique opportunity to be part of an ongoing collaborative project with international labs (Columbia University, Pittsburgh University; US) investigating the neural basis of perceptual decision-making in non-human primates. Finally, I recently secured a British Academy Small Grant (£10K) as a principal investigator, which allowed me to develop and hone my skills as a research team leader, and to further my own line of research. My contributions illustrate my intellectual journey: I started focussing on a very simple actions, and grew to view voluntary action control as an integrated process involving multiple cognitive systems. This intellectual growth has been accompanied by technical training, expanding my skillset along with my theoretical interests. This places me in an excellent position to lead a lab. the next five years, I will further this line of research by combining computational, neuroimaging and behavioural techniques to study how agents adapt their decision-making strategies to changing environments.

Resumen del Currículum Vitae:

I completed a BSc in Biomedical Sciences (2014) and a BA in Philosophy (2015) at the University of Barcelona, receiving Extraordinary Prizes for both degrees. I then obtained a competitive LaCaixa fellowship for postgraduate studies and moved to London to specialise in Cognitive Neuroscience at University College London (UCL) a world-leading institution in the field of Neuroscience. I obtained my MSc Cognitive Neuroscience in 2016, and was awarded the Shallice Prize for the best-performing student in the cohort. Given my interest in voluntary action, I stayed in Prof. Haggard's lab, a world-leading expert in voluntary action, to pursue my PhD (2019). During this time, I acquired advanced electroencephalography, statistical and data analysis skills, published 3 papers, and my doctoral research was awarded the William James Prize by the Association for the Scientific Study of Consciousness on 2023. During my first post-doc, I grew increasingly interested in the interaction between decision-making and voluntary action control. I organised a workshop bringing together experts in both fields, and I published 2 papers and 2 book chapters on the topic. For my next career step, I sought to join Prof. Kelly's lab at UCD (2021-present) to deepen my understanding of perceptual decision-making processes and to acquire advanced computational modelling skills. During my time in this position, I have published 3 articles, with 3 more in preparation. Furthermore, my role involved regular joint meetings across 5 institutions across Ireland and the US, allowing me to interact and establish ongoing collaborations with researchers with similar research interests. In 2023, I also secured independent funding as a principal investigator to further my own line of research (British Academy Small Grant, £10K). This has allowed me to develop research leadership skills, such as project, budget and people management. Throughout my career, I routinely present my work in international conferences (20 talks/posters, 10+ countries, 2 poster prizes), often securing independent funding to attend those conferences, and including 3 invited talks. I am also an active member of the research community, routinely participating in article and grant peer-review panels. Furthermore, I am committed to upholding best-practices in research and systematically make data and analysis code publicly available in all my published work. In parallel to my research activities, I have engaged in multiple forms of teaching throughout my career. I have co-supervised 9 BSc, MSc and PhD students across 3 international institutions (UCL, UCD, Max-Planck), as well as being a guest lecturer and teaching assistant for multiple undergraduate courses and summer schools involving multiple institutions (100+h total). I have also been an invited speaker in multiple popular science activities internationally, bringing research closer to the public. This trajectory illustrates how I have grown to become an independent researcher. At each stage, I sought to learn from leading researchers to help me develop my own line of thinking, and I expanded my technical skillset (EEG, computational modelling, psychophysics) and network along with my interests. I also developed essential skills to lead a lab, such as supervising students, recruiting research assistants, and keeping track of multiple projects.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: KIFFER , LUCIANNA
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Título: Large-Scale Peer-to-Peer Networks: Measurement, Modelling, and Protocol Design

Resumen de la Memoria:

My research trajectory lies at the intersection of large-scale empirical measurement, theoretical modeling, and protocol design for decentralized peer-to-peer (P2P) systems. Across my work, I have combined direct observation of deployed networks with analytical modeling and the proposal of new mechanisms, providing insights into how P2P infrastructures behave in practice and how to engineer them to be more secure, scalable, and robust.

My contributions span three complementary areas. First, I have developed large-scale measurement methods that reveal real-world topology, propagation dynamics, and structural inequalities in blockchain and P2P systems. I led pioneering studies of Ethereum's gossip layer (FC 2021), proposer-builder separation (IMC 2023), and a nine-month longitudinal characterization of 36 cryptocurrency networks (SIGMETRICS 2026), producing datasets and tools widely used by both researchers and practitioners.

Second, I have characterized attacks and strategic behaviors in decentralized networks, showing how adversaries exploit network structure and incentives. This includes validator deanonymization in Ethereum (USENIX Security 2025), arbitrage behavior in decentralized prediction markets (AFT 2025), and strategic latency manipulation (SIGMETRICS 2023). These works have resulted in industry impact, including bug bounties and grants from the Ethereum Foundation and collaborations with major infrastructure providers.

Third, I have contributed theoretical foundations for decentralized network dynamics, developing models that incorporate heterogeneity, incentives, and adversarial behavior. Examples include consensus analysis under bounded processing capacity (CCS 2024) and the stability of networks under greedy peering (SIROCCO 2024, Best Paper Award). These models provide rigorous tools for analyzing fairness, resilience, and decentralization.

The proposed research line builds directly on this agenda: establishing general principles for observability, modeling, and protocol design for next-generation P2P networks, with applications in blockchain, federated learning, and resilient communication systems. Supported by my international collaborations and the research environment at IMDEA Networks, this program consolidates a strong research line in decentralized systems.

Resumen del Currículum Vitae:

My research sits at the intersection of large-scale empirical measurement, protocol and incentive design, and theoretical modeling of decentralized peer-to-peer (P2P) systems. Over the past decade, I have developed a distinctive research agenda that integrates these perspectives to understand how blockchain and P2P networks behave in practice, how their incentive and execution mechanisms function under real-world constraints, and how to design protocols that are both secure and deployable. I have published widely in top venues across systems, security, and networking, including ACM SIGMETRICS, USENIX Security, CCS, IEEE S&P, IMC, and Financial Cryptography, and my work has accumulated more than 800 citations.

A central feature of my trajectory has been sustained international collaboration with both academic groups and industry partners. I have worked closely with organizations such as the Ethereum Foundation, Flashbots, ProbeLabs, IPInfo, Visa Research, Chainlink Labs, and multiple infrastructure providers affected by my empirical findings. Several of my contributions have had real-world impact: FlyClient, developed during an internship at Visa Research, is deployed in the ZCash cryptocurrency and covered by two U.S. patents; a variant of the HaPPY-Mine reward mechanism is incorporated into the Kaspa blockchain; and my measurement-driven work on Ethereum's gossip protocol and validator deanonymization has informed protocol discussions and led to both a bug bounty and a research grant from the Ethereum Foundation.

My research has also been shaped by international mobility across leading institutions. During my two-year postdoctoral appointment at ETH Zurich, funded by the competitive CYD Distinguished Postdoctoral Fellowship, I led and co-led multiple independent projects and supervised several Master's and Bachelor's students whose work evolved into published papers. Earlier internships at Visa Research (U.S.), DAGlabs (Israel), and Chainlink Labs (global) produced influential collaborations and publications. I maintain an active international presence through invited talks at leading universities and research institutes, as well as at major international workshops and congresses in decentralised systems.

I contribute broadly to the community through program-committee service for top international conferences (IEEE S&P, ACM CCS, SIGMETRICS, Financial Cryptography), and as a Steering Committee member for ACM Advances in Financial Technologies (AFT). I have received several competitive awards, including the SIROCCO 2024 Best Paper Award, the CYD Distinguished Postdoctoral Fellowship, the Facebook Fellowship, and scholarships from DFINITY and the Ethereum Foundation.

My research practice is grounded in open science. I design measurement infrastructures, datasets, and analysis tools that I release publicly when compatible with privacy and ethical constraints. I coordinate responsible disclosures with affected stakeholders, and when appropriate, my co-authors and I prepare public-facing summaries to reach practitioners and researchers beyond traditional venues.

Overall, my trajectory reflects a combination of independent research leadership, impactful collaborations, and a commitment to bridging theory, measurement, and practical protocol design in decentralized systems.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: ARREGUI BRAVO, GUILLERMO
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Título: Engineered sub-wavelength nanostructures for strong photon-matter interfaces

Resumen de la Memoria:

Durante muchos años se asumió un límite fundamental al confinamiento óptico en materiales dieléctricos, equivalente al volumen de un cubo con lado la longitud de onda. Sin embargo, avances recientes han demostrado que es posible confinar luz muy por debajo de ese límite y que el factor real que lo condiciona es la capacidad de fabricar estructuras con dimensiones nanométricas. Este régimen de confinamiento extremo permite interacciones inéditas entre luz y materia como con modos vibracionales en sistemas optomecánicos pero también hace que el tamaño de las estructuras sea comparable al de las imperfecciones de fabricación. La motivación de mi investigación es comprender el comportamiento de sistemas fotónicos en este paradigma donde el control determinista de la luz choca con el inevitable desorden, con el fin de reforzar el confinamiento óptico y el acoplamiento entre luz y grados de libertad mecánicos.

En mis casi nueve años de carrera he estudiado la propagación, dispersión y confinamiento de la luz en este régimen. He demostrado que, en guías de onda de cristal fotónico con una ranura central de pocas decenas de nanómetros de ancho, surgen tres efectos simultáneos: la ranura confina la luz muy por debajo de la longitud de onda; la rugosidad genera interferencia que confina longitudinalmente; y las cavidades aleatorias que aparecen presentan confinamientos comparables o superiores a los de cavidades diseñadas ad hoc. Estas cavidades se acoplan además de forma intensa a modos vibracionales, desde flexurales de baja frecuencia hasta modos guiados en el rango hipersónico. Para este último caso, la red fotónica debe generar también una banda prohibida mecánica; durante mi tesis caractericé la mayor demostrada en un cristal fonónico hipersónico y la utilicé para crear sistemas optomecánicos multimodo de alta frecuencia con aplicaciones en procesamiento de señales clásico y cuántico. Como estos efectos escalan con la anchura de la ranura, dediqué gran parte de mi investigación a perfeccionar la litografía y el grabado en silicio, así como a desarrollar procesos de self-assembly compatibles con esa misma tecnología, pero capaces de alcanzar confinamientos ópticos de otra forma inaccesibles.

El desorden inherente a estas estructuras motivó también investigar si las guías de cristal fotónico topológicas pueden ofrecer resiliencia frente a dichas imperfecciones. Aunque esa propiedad tendría implicaciones relevantes especialmente para la fotónica cuántica integrada mis resultados indican que los niveles de desorden tolerables para que la protección topológica se manifieste siguen siendo inalcanzables incluso en plataformas de fotónica de silicio de última generación.

Recientemente, como investigador postdoctoral en EPFL, he decidido dejar en segundo plano la física mesoscópica para concentrarme en el uso de resonadores optomecánicos como sensores de fuerza y radiación extremadamente sensibles. Para ello exploro el acoplamiento de resonadores mecánicos de nitruro de silicio tensionado, que presentan tiempos de vida récord, con el campo cercano de diversas estructuras nanofotónicas. Esta etapa se alinea con mi objetivo a largo plazo y el que querría alcanzar en esta Ramón y Cajal: llevar los dispositivos optomecánicos desde el laboratorio a plataformas integradas con impacto real en detección, metrología y procesamiento de señales.

Resumen del Currículum Vitae:

Mi formación universitaria es como Ingeniero de Caminos, Canales y Puertos por la Universitat Politècnica de Catalunya y como Ingénieur por la École Polytechnique de París, en modalidad de doble diploma. Cursé dos años y medio en esta última, donde mis intereses se orientaron hacia la física moderna, los dispositivos semiconductores y la óptica. Antes de finalizar el segundo año de máster en la UPC, especializado en ingeniería computacional, realicé estancias de investigación en el Helmholtz Zentrum Berlin y en el Institut de Ciències Fotòniques, trabajando en celdas solares.

Tras mis estudios obtuve una beca del Barcelona Institute of Science and Technology para realizar el doctorado en el Institut Català de Nanociència i Nanotecnologia. Mi tesis, Light-motion interaction in disordered nanostructures, supervisada por el Dr. Pedro David García y desarrollada en el grupo de la Prof. Clivia M. Sotomayor Torres, combinó nanofabricación de dispositivos de silicio nanoestructurados, espectroscopía óptica y simulaciones numéricas. Estudié el papel del desorden de fabricación en dieléctricos periódicamente nanoestructurados, demostrando fenómenos de optomecánica de cavidad mediados por dicho desorden y un cristal fonónico con una banda prohibida hipersónica de amplitud récord. Además, participé en dos proyectos europeos FET de consorcios internacionales, uno sobre circuitos fonónicos basados en interacciones optomecánicas y otro sobre transporte topológico bosónico. La tesis recibió la calificación de Summa Cum Laude y el Premio Extraordinario de Doctorado de la UAB.

En 2021 me incorporé al grupo del Prof. Søren Stobbe en la Universidad Técnica de Dinamarca. Inicialmente trabajé en un proyecto industrial para desarrollar espectrómetros integrados en chip destinados al control de calidad in situ y a gran escala en la producción de leche. Mis principales contribuciones fueron el diseño y la caracterización óptica de componentes fotónicos de silicio y la implementación de un nuevo laboratorio para la medida de dispositivos nano-electro-optomecánicos. Al año siguiente obtuve una beca postdoctoral Marie Skłodowska-Curie para investigar guías de onda de cristal fotónico con propiedades topológicas y confinamiento extremo. Estos trabajos revelaron los límites prácticos de la protección topológica en sistemas fotónicos recíprocos y permitieron demostrar un proceso de fabricación capaz de lograr un confinamiento óptico inaccesible mediante litografía y grabado convencionales. Durante este periodo codirigí dos tesis doctorales y supervisé más de cinco proyectos de investigación, consolidando mis capacidades de liderazgo.

En 2024 me incorporé al grupo del Prof. Tobias J. Kippenberg en la École Polytechnique Fédérale de Lausanne, donde coordino el desarrollo de sensores optomecánicos integrados que presentan modos mecánicos con tiempos de vida récord a temperatura ambiente. Me centro particularmente en la detección de radiación en el infrarrojo medio mediante el desplazamiento de la frecuencia de vibración de membranas de nitruro de silicio. Esta etapa



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

se alinea con mi objetivo a largo plazo: llevar los dispositivos optomecánicos desde el laboratorio hacia aplicaciones reales sin perder una comprensión profunda de su física.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: RAMIREZ ESPINOSA, PABLO
Referencia: RYC2025-056907-I
Correo Electrónico: pablорamesp@gmail.com
Título: Analysis, design and signal processing for heterogeneous metasurface antennas
Resumen de la Memoria:

During my research trajectory, I have pioneered innovative approaches at the intersection of communications, signal processing, and electromagnetism, leading to new lines of research and impactful project applications in areas ranging from channel modeling and metasurfaces to ultra-reliable low-latency communications (URLLC) and fluid antenna technologies.

My doctoral period at University of Málaga (UMA) focused on applied statistics and channel modelling, participating as research team member in a national-funded project and visiting Queen's University Belfast (QUB) for 3 months. At QUB, I worked closely with Dr. David Morales, seeding the interest in applied statistics and signal processing for communications. I was then included in Dr. Morales' collaborative network, who ended up being my supervisor in my 'María Zambrano' postdoctoral fellowship at University of Granada (UGR) a few years later.

After the PhD, I moved to Aalborg University (AAU) for two years and a half as a postdoctoral researcher in the group headed by Prof. Petar Popovski. There, I started working on two new lines: metasurface antennas for communications, and statistical ultra-reliable low-latency communications (URLLC). Each of these directions have led to important publications, have extended my collaboration network, and have allowed me to participate in two contracts with Huawei Technologies Sweden. The wide experience acquired at AAU had remarkable consequences in my career. First, it allowed me to get a 'María Zambrano' fellowship at UGR and an MSCA postdoctoral fellowship at UMA. Second, it provided me with a strong collaboration network. Last, it allowed me to develop my own research line, in the intersection of signal processing, communications and electromagnetism, that has benefited my host groups at UGR and UMA.

My next postdoctoral period was at UGR as a 'María Zambrano' postdoctoral fellow. Apart from continuing developing my own research line started at AAU, I started a new line on fluid antenna systems in collaboration with Prof. Kai-Kit Wong (University College London), which led to my most cited publications and my participation in several workshops as invited speaker. During this period I also started collaborating with the SWAT group, whose expertise in antenna theory has strengthened my own research line.

In July 2024 I joined UMA as a MSCA postdoctoral fellow. The project is a continuation of the works started during my period at AAU combined with my research lines at UGR, and focuses on heterogeneous metasurface antennas with multiple functionality and their use for energy efficient communications.

Resumen del Currículum Vitae:

Pablo has eight years of research experience in wireless technologies, five of which correspond to postdoctoral work. He is currently a MSCA Postdoctoral Fellow at Universidad de Málaga (Spain), with his main research activity focused on the analysis and design of metasurface and fluid antennas and their impact on energy efficiency in mobile networks. This research line merges the activities carried out during his 'María Zambrano' Fellowship at Universidad de Granada (Spain), which focused on fluid antenna systems, and the lines started at Aalborg University (Denmark) during his first postdoctoral period, where Pablo worked on dynamic metasurface antennas and electromagnetic analysis of communication systems. Besides, he has worked

on different topics, including ultra-reliable low-latency communications (URLLC), signal processing for communications and channel modelling.

These research activities have led to multiple publications in prestigious journals and conferences. In total, Pablo has published 18 JCR journal articles (15 of them without his PhD advisors), 13 of which are in Q1 ranked journals such as IEEE Transactions on Wireless Communications, IEEE Wireless Communications, IEEE Transactions on Communications, IEEE Transactions in Forensics and Security, and IEEE Wireless Communications Letters. He has also produced 9 contributions to international conferences, including prestigious ones like IEEE Globecom and ICC, and 1 book chapter. The applicant has an active international collaboration, having co-authored papers with more than 30 different researchers from 10 different universities and research centers.

Pablo has participated in 6 research projects (national and regional funded) as a research team member, two of them focused on energy efficiency [P2, P3], as well as in 2 contracts with Huawei Technologies in Aalborg, one of them concluded with two patent ideas transferred to the company. Moreover, the applicant's independence is shown by his 'María Zambrano' Fellowship, a competitive national call, and the MSCA Postdoctoral Fellowship (project EEDDMA with reference 101109529), a European competitive call, where Pablo is the principal investigator.

Regarding supervision, Pablo is currently co-supervising, together with David Morales-Jiménez, a PhD student at University of Granada funded by a FPI grant (PREP2023-001949) in the context of the research project PID2023-149975OB-I00 (COSTUME). He has also co-supervised 2 B.Sc and 1 M.Sc Theses at University of Malaga. At Aalborg University, he has also co-supervised 2 student projects, one of them in collaboration with Kamstrup A/S, and has closely supervised two PhD. Besides, he has been involved in teaching activities in the area of Wireless Communications, and he has delivered multiple talks at MSc and PhD level at University of Málaga, University of Granada, University of Aalborg, and Universidad Nacional del Sur (Argentina).



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Turno General

In terms of professional service, Pablo serves as an Associate Editor for IEEE Transactions on Signal Processing, and he is a frequent reviewer for the most prestigious journals in the field of wireless communications. Pablo has obtained the Exemplary Reviewer Certificate (top 3% reviewers) for IEEE TCOM in 2019 and 2020, and he has served as TPC member in several conferences such as IEEE ICC 2024, IEEE VTC 2024 and IEEE VTC2023.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MÉNDEZ COBEÑA, GONZALO GABRIEL
Referencia: RYC2025-055152-I
Correo Electrónico: ggmenco1@upv.es
Título: Interactive, User-Adaptive Visual Narratives for GenAI Transparency

Resumen de la Memoria:

My research trajectory has been guided by a central, long-term goal: building visual and interactive systems that empower people to interpret complex computational outputs and act on them responsibly. This vision first emerged during my PhD, where I explored constructive visualization, an approach that reimagines visual analytics as an active, user-driven process. Through empirical studies, I examined how interaction, data granularity, and user agency affect comprehension, creativity, and cognitive effort, establishing foundational principles for tools that support users' thought processes rather than simply displaying data. Building on this, I later expanded my work to human-centered algorithmic decision-making in systems based on artificial intelligence (AI). Using education as a case domain, I studied how students and academic advisors interpret and respond to predictive tools, revealing how people negotiate trust, manage uncertainty, and perceive fairness in algorithmic recommendations. Over time, this work clarified a central insight that now frames my research agenda: explanations are not just outputs, but interfaces that must align with people's needs, stakes, and abilities. More recently, I have advanced behavioral approaches to estimate mental load from motor behavior during cognitively demanding tasks. Together, these methods open a practical path toward tailoring explanation form, pacing, and structure to users' cognitive and attentional conditions.

Against this backdrop, I propose a research line centered on adaptive visual narrative explanations for generative AI (GenAI) systems, an approach designed to meet the growing need for clarity, accountability, and contextual relevance as AI shapes decisions across domains. GenAI models already support a wide range of tasks (e.g., summarizing decisions, generating plans, offering guidance). Yet their outputs frequently remain opaque, misleading, or poorly aligned with user goals. Even a simple question like "Why did the GenAI system do this?" can reflect vastly different explanatory needs depending on who is asking. In a medical context, for instance, a patient may need a clear account of a treatment recommendation; a doctor may require medically grounded reasoning and professional accountability cues; and an AI engineer may need insight into mechanisms, data flows, and failure points.

My goal is to build the algorithmic foundations for adaptive, interactive narratives that blend text, visuals, and interaction to explain GenAI behavior. These narratives will go beyond surface simplification, adjusting their reasoning, structure, narrative logic, and visual form to meet each user's role, expertise, and cognitive demands. I will pursue this agenda through four interconnected objectives: (1) identifying users' narrative needs; (2) designing structured models that map XAI signals into visual narratives; (3) building adaptive pipelines that tailor these narratives to different users; and (4) evaluating them in real-world settings to understand their impact on understanding and trust. The results of this research will enable explanation systems that support more accountable, understandable, and trustworthy uses of GenAI. By making these systems more transparent and responsive to diverse user needs, this work will help ensure that AI serves the people it affects.

Resumen del Currículum Vitae:

My academic and professional trajectory combines high-impact research in Human-computer Interaction (HCI) and Information Visualization (InfoVis), sustained international mobility, and hands-on experience building and studying user-centered interactive systems for diverse domains and AI-assisted decision-making.

I earned my degree in Computer Engineering at the Escuela Superior Politécnica del Litoral (ESPOL, Ecuador) with a full scholarship. I completed a Master's in Computer Science at the Vrije Universiteit Brussel (VUB, Belgium), graduating cum laude (with honors) under a competitive VLIR-UOS scholarship. Later, I obtained a PhD in Computer Science from the University of St Andrews (United Kingdom), supported by a competitively awarded national scholarship from Ecuador's higher education and science agency (SENESCYT). This training across the higher educational systems of three different countries shaped a research agenda that bridges rigorous empirical methods with interactive system design.

After my PhD, I continued my international development through a postdoctoral fellowship at the University of Calgary (Canada) and a research visit to Simon Fraser University (Canada). In 2019, I returned to Ecuador as a full-time Associate Professor at ESPOL and Director of the Human-centered Computing research program at its Information Technologies Center (CTI). Over five years, I led applied projects in educational analytics, civic technology, and urban data, mentored research assistants and engineers (many without prior research training), and strengthened a pipeline of junior collaborators. In parallel, I taught core undergraduate programming courses (Data Structures, Object-oriented Programming) and a graduate Information Visualization course for master's and PhD students. During this period, I completed further research stays at the University of Victoria (Canada) and Inria Rennes (France), which seeded collaborations that remain active today.

My publication record includes over 30 peer-reviewed works (615 citations, h-index 11), with papers in highly selective venues such as CHI, UIST, CSCW, LAK, VL/HCC, JLA, and ICMI. In HCI and InfoVis, flagship conferences are the primary archival outlets for top-tier research. Several of my publications appear in venues classified as A* or A in the CORE ranking and as Class 1 or Class 2 in Spain's GII-GRIN-SCIE framework, categories that are commonly regarded as comparable in prestige and selectivity to top-quartile JCR or SJR journals in related areas. My work has received international recognition, including a Best Paper Award at LAK, a Best Demo Jury Award at ISS, and a Best Student Paper Award at TVX (as a coauthor). I also contribute to the field as a frequent reviewer for CHI, CSCW, IEEE VIS, and LAK.

Currently, I am a postdoctoral researcher at the Valencian Research Institute for Artificial Intelligence (VRAIN) of the Universitat Politècnica de València (Spain), where I develop technologies that help people understand algorithmic decisions and how AI systems handle personal data. I also hold a



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

prestigious and highly competitive Inria International Chair (2024-2026), which supports my long-term collaboration with Inria Rennes on explainable and human-centered AI.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: CHIABRERA CHIABRERA, FRANCESCO MARIA
Referencia: RYC2025-055430-I
Correo Electrónico: f.chiabrera@gmail.com
Título: Ionotronic Devices for Energy-Efficient Brain-Inspired Computing

Resumen de la Memoria:

I am a Research Scientist and Marie Skłodowska-Curie Fellow at the Catalonia Institute for Energy Research (IREC, Barcelona), where I lead research on ionotronic and neuromorphic devices—solid-state systems that exploit ionic motion to dynamically control electronic, magnetic, and optical properties. My goal is to establish new computing architectures inspired by neural systems, bridging materials science and computer engineering for next-generation artificial intelligence hardware.

I obtained my Ph.D. at IREC (2015–2019) within the ERC-CoG ULTRASOFC project, engineering oxide thin films to enhance silicon-integrated micro—solid oxide fuel cells (micro-SOFCs) for portable power generation. This stage built my expertise in thin-film growth, interfacial design, and electrochemical characterization (Advanced Materials 2019).

As postdoctoral researcher at IREC (2019–2020), I developed operando methods such as Isotope-Exchange Atom Probe Tomography and in-situ spectroscopic ellipsometry, providing nanoscale insight into ionic motion in oxides (Advanced Materials 2021, ACS Applied Materials & Interfaces 2022).

From 2020 to 2022, at the Technical University of Denmark (DTU), I served as leading postdoc in the Villum-funded NEED project, developing vertically aligned nanostructures and freestanding oxide membranes that enable multifunctional integration in microdevices (Advanced Materials 2022, Nature Communications 2024).

Since returning to IREC in 2022, I have led the development of oxide-ion synaptic transistors as Work Package Leader in the ERC Proof of Concept TRANSIONICS, resulting in the patent Electronic Transistor (WO2022263659A1) and a publication in Advanced Materials 2025. In 2024 I launched my MSCA Fellowship MAGNOXY, establishing an independent line on magneto-ionics and solid-state memories based on ion-induced magnetic transitions in perovskite oxides.

A distinctive feature of my research is the design of ionically reconfigurable materials that merge logic and memory in a single device, offering a hardware platform for in-memory computing and analog learning. I have developed original operando methodologies (IE-APT, Iono-Optic Impedance Spectroscopy, Isotope Exchange Raman Spectroscopy) that couple ionic and electronic degrees of freedom to model device behavior across scales.

My current research line targets ionotronic neuromorphic electronics, aiming to:

- 1) develop stable solid-state ionic conductors with high mobility at room temperature;
- 2) control ion insertion and its coupling to electronic, magnetic, and optical functions;
- 3) realize adaptive, self-organizing neuromorphic devices;
- 4) scale oxide-ion synaptic transistors into analog computing arrays;
- 5) scalable arrays for in-memory and edge AI computing.

Overall, my trajectory unites fundamental understanding, device engineering, and technology transfer, supported by international collaborations (DTU, CNRS, Imperial College London, Colorado School of Mines) and leadership in European projects. My long-term goal is to consolidate a reference research program in ionotronic and neuromorphic materials, advancing the foundations of adaptive, energy-efficient computing.

Resumen del Currículum Vitae:

My research combines materials discovery, device innovation, and technological transfer across solid-state ionics, oxide electronics, and neuromorphic computing. I have contributed to seven competitive research projects, including four EU-funded programs, and coordinated work packages in the ERC PoC TRANSIONICS and ERC-CoG ULTRASOFC projects.

I have authored 40 peer-reviewed papers (8 first-, 7 corresponding author), including 14 in high-impact journals such as Advanced Materials, Nature Communications, and Nano Energy (h-index 16, >850 citations). My collaborations extend across Europe and the USA (DTU, CNRS, Imperial College London, Colorado School of Mines). Since 2020 I have co-authored more than 70 conference contributions and delivered 11 oral presentations, 3 invited talks, and 1 invited tutorial on ionotronics (Solid State Ionics 2024). I also organize the symposium “Neuromorphic Materials” at MATSUS26 (Barcelona 2026), consolidating my international visibility.

I am co-inventor of two patents, including the active Electronic Transistor, now being explored with Worldsensing S.L. within the submitted EIC Transition project EDGEIONICS for smart-infrastructure monitoring. Within MAGNOXY, I collaborate with Nano4Energy S.L. on scalable ionotronic device fabrication and have participated in Ginjol and Lab2Market programs to transfer micro-SOFCs and synaptic transistors toward industrial use.

I have demonstrated capacity for independent project development and research leadership, as reflected in my coordination of work packages in ERC projects, my Marie Skłodowska-Curie Fellowship MAGNOXY, and the submission of the ERC Starting Grant TOPIOINICS (2026 call). These milestones evidence a coherent trajectory toward independence and international recognition in the field of ionotronic and neuromorphic devices.

Mentoring and training are central to my activities. I have supervised or co-supervised five Ph.D. theses (two defended, three ongoing) and three M.Sc./B.Sc. projects. Completed doctorates include Dr. Yunqing Tang (2022) and Dr. Philipp Langner (2025), whose work led to the Advanced Materials 2025 demonstration of a solid-state synaptic transistor. I regularly advise early-career researchers on thin-film microfabrication and operando electrochemical techniques.

My scientific contributions have been recognized through several distinctions: JPhys Energy Emerging Leader 2022, Best Mid-Career Award (E-MRS 2023), Early Career Presentation Award – First Place (London 2020), and three Best Poster Awards. I act as referee for >20 international journals, including Journal of Materials Chemistry A, ACS Applied Materials & Interfaces, and Nano Letters, ensuring the quality and integrity of research in my field.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I actively promote public engagement and science communication through more than ten outreach activities, such as the European Researchers' Night (2024-2025), the science play "Which Will Be the Intelligence of the Future?" (Barcelona Science Fest 2024-2025), and public debates on electromobility (2023).

Overall, my career reflects a coherent progression toward scientific leadership and societal impact, linking fundamental research on ionic transport with the design of neuromorphic and magneto-ionic devices, and positioning me at the forefront of the emerging field of ionotronic computing.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MORENO MUÑOZ, PABLO
Referencia: RYC2025-056543-I
Correo Electrónico: pablo.moreno@upf.edu
Título: ML/AI Researcher in Probabilistic Models and Uncertainty Quantification
Resumen de la Memoria:

KEYWORDS: Artificial Intelligence (AI), (Probabilistic) Machine Learning, Uncertainty Quantification (UQ), and Applied Statistics

Research career (2016-2025): Since the start of my Ph.D. in 2016, the total research output has been 20 manuscripts/papers, and 3 posters in other workshops/congresses and minor meetings. In detail, the 20 papers can be divided into: 14 publications according to the C.1 class in this application report, 3 works of type C.2, and 3 extra arXiv preprints that refer to publicly available and yet unpublished works or other papers that are under review. Considering the two well-distinguished periods of the investigator's research career, the previous papers can be divided into the following parts: Period I (Ph.D.) 7 publications (C.1) with one NeurIPS spotlight, 1 workshop/congress paper (C.2), and 2 arXiv preprint works. Period II (postdoctoral) In three years and six months of postdoctoral role, the total research output has been 7 publications (C.1), where 6 of them are in NeurIPS main-track proceedings, 3 arXiv preprints (some of the previous ones in the Ph.D. period were accepted for publication), and 2 papers of type C.1.

Since November 2024, when I was awarded the Fundación La Caixa Junior Leader Grant (Incoming Call) for the next 3 years, all my research activities have been fully independent and integrated in the AIML research group at UPF in Barcelona. Proof of that is my secondment period at the University of Oxford with Mark van der Wilk during the last 6 months (May-Nov).

Since 2024, I have been an ELLIS Member. The ELLIS society acronym corresponds to the European Laboratory for Learning and Intelligent Systems, which started in December 2018 as a pan-European initiative to retain AI/ML science talent in the EU due to the acceleration of the AI-industrial race in America and Asia since 2017. It was initially supported by the Max Planck Institute for Intelligent Systems (Tuebingen), and some new ELLIS research institutions have been inaugurated. Additionally, my former boss and advisor (Søren Hauberg), together with other good colleagues of mine from DTU and the Pioneer Center for AI (I was a member when in Denmark), have recently organized a version of the NeurIPS conference in Europe with great success (see <https://eurips.cc/>).

Awards, grants, technical committees, and significant mentions. In these years of my research career, I've received three main grants: one from the Spanish Ministry of Economy (FPI grant) and another from the Danish Data Science Academy (DDSA). The third and big one comes from the Fundación La Caixa in 2024, with more details in pp. 10 and the CVA. Additionally, in 2021, I received the special cum-laude mention for my Ph.D., and I've also received the spotlight special mention in NeurIPS 2018 and twice the top 10% reviewer in top ML/AI conferences (ICML 2022; NeurIPS 2023). Since 2018, I have been part of the annual technical committees (reviewing tasks) for most of the major ML/AI conferences and journals. To name a few: NeurIPS, ICML, ICLR, AISTATS, JMLR, TMLR, TPAMI, etc. The exact years for each reviewing service can be found on my personal website.

Resumen del Currículum Vitae:

Short Bio.

- Academic visitor (6 months) at the Dept. of Computer Science, University of Oxford.
- Research Fellow at the AIML Group, Dept. of Engineering. Universitat Pompeu Fabra
- Awarded by Fundación La Caixa with one (Incoming) Junior Leader Fellowship.
- Postdoctoral researcher at Technical University of Denmark (DTU), Copenhagen.
- Research intern at Max Planck Institute for Intelligent Systems, Germany.
- PhD in Machine Learning, Universidad Carlos III de Madrid (UC3M), Spain.
- Visiting Research Student at the University of Sheffield, UK.
- Trainee at European Space Agency, (ESA-ESAC)
- BSc and MSc in Telecommunications Engineering at UC3M, Spain.

I.1.) ML/AI contributions and peer-reviewed publications.

- 7 top-conference ML/AI publications in the main track of NeurIPS. H5-index 2022: 309, Impact Factor (IF) 2022: 23,27. In years: 2018, 2021, 2022 (x2), 2023 (x2), 2024. Main topics and ideas: Probabilistic AI/ML methods, uncertainty quantification, stochastic/Gaussian processes, Bayesian NNs, and self-supervised learning.
- 2 times selected as spotlight (short-oral presentation): (~10%) in NeurIPS.
- 1-time conference ML/AI publication at Artificial Intelligence and Statistics (AISTATS) 2023. Main topics: Probabilistic numerics and probabilistic algebra applied to Gaussian process regression.
- 2 medical journal papers on the application of ML/AI to personalized medicine. JMIR (x2) Impact factor (IF) 2023: 7,4.
- Additional publication track lists in other journals (e.g., Pattern Recognition), conference proceedings (e.g., ICASSP), and workshops (e.g., NeurIPS Workshop on Machine Learning for the Health (ML4MH)), all linked to core ML/AI research.

I.2.) International research experience.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

- 6-month secondment as academic visitor at the University of Oxford (UK), collaborating with Mark van der Wilk on a principled new research agenda. The main topic was the principled connection between stochastic partial differential equations (SPDEs) and Gaussian processes, with the aim of building UQ-aware NNs.
- 3.5 years of (international) postdoctoral experience working with Søren Hauberg in fundamental AI/ML at the Technical University of Denmark in Copenhagen. It is one of the leading technical universities in Europe, also with one of the largest focuses and investments in AI research at the moment.
- 2 visits at top ML/AI labs in Europe (+UK). The Dept of Computer Science at the University of Sheffield was then the center of ML/AI research on Gaussian processes and UQ, due to the lab of Neil Lawrence, now a professor in Cambridge. My visit/internship to the Max Planck Institute for Intelligent Systems was also at the Empirical Inference Department, whose Director is Bernhard Schölkopf and needs no further presentation (i.e. awarded with Prize 2020 BBVA Fronteras del Conocimiento)
- Early career research experience at the European Space Agency (ESA). AI/ML methods applied to astronomical data (advanced statistical estimation of distances to galaxy clusters) from the European Space Astronomy Center.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones

Nombre: ROSATI ROSATI, GIULIO

Referencia: RYC2025-056792-I

Correo Electrónico: rosatigiulio@gmail.com

Título: One-step printed microneedles for (bio)sensing

Resumen de la Memoria:

My line of research will be focused on the consolidation and development of the proof of concepts studies published on the scalable one-step aerosol jet printed fabrication of noble metal microneedles for sensing and biosensing applications. This research line will be developed pursuing a series of objectives:

1. First, the design → testing different and more resilient nature-inspired architectures, for example following Gaudí's steps. The aim is to obtain stronger mechanical properties using less but better organized material.

2. Materials → introduction of new materials such as gold, carbon, graphene, etc. and advanced real-time sintering in order to build up a full microneedle-based electrochemical cell to be able to perform more complex sensing and biosensing (as explored in my previous publications: gold, graphene).

3. Functionalization → introduction of simple functionalization methods and mechanism of detection. For example taking advantage of CRISPR/Cas to perform a unique functionalization but with multiplexed output controlled by the guide-RNA provided to the enzyme (as explored in one of my previous publications)

4. Validation for applications in agronomy → precision farming to limit/avoid pollution and optimize the usage of resources is one of the main objectives of this research line. Important collaborations with specialized centres for this objective has already been defined (Firat Guder, Imperial college London and Michal Otyepka, Regional Centre of Advanced technologies and Materials).

5. Validation for applications in neuroscience and electrophysiology → this challenging area would benefit a lot from this technology and smart readout systems such as the one presented in my previous publications. In particular, an active collaboration with University La Sapienza of Rome and Fondazione Santa Lucia will be very important to go in this direction once assessed the robustness of the system and the compliance with the regulation in the area.

6. Sustainability, circularity and scalability → These transversal objectives will be considered since the beginning because they influence the whole process of design, materials selection, fabrication, usage and disposal. This will be performed and achieved thanks to the experience acquired in Eurecat and the network of collaborators built on these topics in the EMERGE project. Regarding circularity, an idea that will be developed in my research line is related to the recovery of noble metals from electronic waste, working both on standard electronics and printed electronics with chemical or physical methods (collaboration with RHP Technology and University of Barcelona, this last one not published yet).

Resumen del Currículum Vitae:

My career is marked by a strong interdisciplinary spirit. I started my studies in 2006 in Information Engineering and I moved to Bioengineering after having obtained the bachelor degree in 2009. In 2011 I completed my master thesis work on a lactic acid biosensor and I decided to further explore the field with a PhD in Biotechnology on an electrochemical screening device for illicit anabolic treatments in the meat industry, which I completed in 2015. Since then, I have been extending my knowledge of electrochemistry, materials science, and nanotechnology with a postdoc at the University of Padova (2016-2019), during which I introduced an inkjet printing fabrication method for electrochemical biosensing devices based on nanofunctional inks, and with a postdoc at the Catalan Institute of Nanoscience and Nanotechnology (2019-2025), where I strengthened this research line with new materials, methods, and applications. Finally, I landed in Eurecat (2025)

Currently, I am a happy father of two twins and an advanced researcher at Eurecat, where I am responsible several European research projects. I am also teaching at UAB, and at ICN2 I was supervising/tutoring students further developing the inkjet printing technology, introducing new materials and sintering methods, and employing the devices for application in the healthcare and environmental sectors. Furthermore, I have been guiding a parallel research line in ICN2 for the development of smart readout technologies, to implement and integrate on-chip not only the nanobiosensors but also the needed equipment for point-of-care measurements.

At ICN2, I have been responsible for the activities related to important WPs in two important EU projects, i.e. MICROB-PREDICT and EMERGE, and two national projects, i.e. Nanoanaemia and ScreenEC. All the activities are focused on the development of novel and innovative nanobiosensors, with MICROB-PREDICT being focused on microbiome biomarkers of liver diseases, EMERGE on flexible electronics systems for several analytes being copper in blood just one of them, Nanoanaemia focusing on diagnosis and classification of anaemia at the point of care, and ScreenEC being oriented to the diagnosis of endometrial cancer. Furthermore, I am the entrepreneurial responsible of an AGAUR Llabor project.

Joint with the transversal interdisciplinary soul of my career across disciplines I also explored the vertical one, working in public and private research institutions and universities, collaborating with several spinoffs, companies, and industries, and conducting small-volume clinical trials with clinical entities. Further completion of my profile came from my business and project management formation acquired with courses during business plan competitions and prestigious centers (e.g. ESADE, BIST).



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Turno General

I am glad to have been guest editor of a special issue for Biosensors and Bioelectronics focusing on new nanobiosensing technologies approaching the market for healthcare applications, and of being part of the evaluation committee of a Ph.D. student at ICN2 and of the one for a Ph.D. thesis defense for the Centre Nacional de Microelectronics (CNM). Furthermore, I have co-organized international conferences in the framework of Trends in Nanotechnology (2021-22-23) and I am editor of Discover Electrochemistry, a journal belonging to the Nature family.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MUÑOZ MARTIN, JOAN FRANCESC
Referencia: RYC2025-055641-I
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Título: ISCP-6G: Integrated Sensing, Communication, and Positioning in Cognitive Non-Terrestrial Networks

Resumen de la Memoria:

The proposed research line, "Integrated Sensing, Communication, and Positioning in Cognitive Non-Terrestrial Networks" (ISCP-6G), addresses the current fragmentation in space systems where satellites require distinct, resource-intensive payloads for data transport, Earth Observation, and navigation. This proposal is grounded in my extensive background in GNSS-Reflectometry (GNSS-R) and Microwave Radiometry developed during my Ph.D. and tenure at NASA/JPL. My prior work designing the FMPL-2 instrument and deriving Stokes parameters from SMAP-R demonstrated how standard navigation signals could be opportunistically exploited for precise environmental sensing. This expertise is critical for the proposed ISCP framework; specifically, my knowledge of how GNSS signals interact with scattering surfaces allows me to address the multipath challenges inherent in positioning. By leveraging the physics of signal scattering—traditionally used for remote sensing in my previous research—I can optimize 6G waveforms to enhance positioning accuracy (PNT) in complex environments, transforming what is usually considered "noise" or interference into valuable environmental context.

My central hypothesis is that by leveraging Open RAN (O-RAN) architectures and software-defined payloads, we can transform a standard communications satellite into a "distributed sensor" capable of monitoring the environment and providing navigation services using dedicated O-RAN hardware. The objective is to define a 6G ISCP payload architecture that dynamically multiplexes Positioning Reference Signals (PRS) and active sensing waveforms with standard user data streams. This involves developing dual-function waveforms and signal processing techniques that allow 6G OFDM signals to be used for active scatterometry and sub-15 meter positioning (LEO-PNT) without degrading the capacity of the communication link. This represents a strategic pivot from my previous research on passive sensing instruments (GNSS-R) toward active, virtualized telecommunications infrastructure, requiring the optimization of signal structures to manage the trade-offs between sensing resolution and data throughput via software-defined networking.

The methodology for ISCP-6G follows a technology development roadmap starting with the implementation of the O-RAN protocol stack and specific "Network Applications" (xApps) on FPGA platforms within i2CAT's NTN Lab to model theoretical performance. This will be followed by field deployments using terrestrial testbeds or High Altitude Platforms to demonstrate ranging capabilities and environmental characterization in a relevant environment. The research culminates in an in-orbit demonstration by deploying the developed ISCP software stack onto a satellite platform, effectively using the satellite as a programmable laboratory to validate the cognitive algorithms in space. The empirical data gathered will provide critical inputs to 3GPP Releases 20 and 21, specifically for study items regarding 6G-PNT and 6G-ISAC, driving the transition from theoretical concepts to standardized industrial implementation. Ultimately, this research supports European strategic sovereignty by enabling commercial satellite fleets to act as a resilient, GNSS-free PNT backup and offering new sensing services through software upgrades rather than physical hardware launches.

Resumen del Currículum Vitae:

My research career is defined by a consistent trajectory bridging Signal Theory, Earth Observation (EO), and Space Systems Engineering, evolving from validating the "NewSpace" paradigm via nanosatellites to advancing fundamental polarimetric science at NASA/JPL, and currently, to defining the future of 6G Non-Terrestrial Networks (NTN) as the Director of the Space Communications Research Group at Fundació i2CAT. During my Ph.D. at Universitat Politècnica de Catalunya (UPC), I pioneered the development of miniaturized EO payloads, serving as the lead architect for the Flexible Microwave Payload-2 (FMPL-2), the first combined GNSS-Reflectometer and L-band Radiometer payload on a CubeSat. This instrument flew on the FSSCat mission, the winner of the 2017 ESA Sentinel Small Satellite Challenge and the overall Copernicus Masters, validating that nanosatellites could support the Copernicus program. I designed a hybrid architecture integrating a Zynq SoC with a high-performance SDR front-end to enable in-orbit reconfiguration, and I developed novel retrieval algorithms using Artificial Neural Networks (ANNs) to fuse GNSS-R data with radiometric brightness temperatures. This work produced accurate retrievals of Essential Climate Variables such as soil moisture and sea ice concentration, earning three "Best Ph.D. Thesis" awards. Following my doctoral studies, I joined NASA's Jet Propulsion Laboratory (JPL), where I expanded my expertise into fundamental physical science and quantum instrumentation. At JPL, I developed the mathematical framework to retrieve full Stokes parameters from hybrid compact polarimetric signals, allowing for the decomposition of scattering mechanisms and the retrieval of soil moisture and vegetation information. This work led to my role as Principal Investigator for a NASA ROSES grant, securing independent federal funding to refine sea-ice models. Simultaneously, I led the digital backend development for the Microwave Temperature and Humidity Profiler (MTHP), the first airborne 60 GHz spectrometer for Planetary Boundary Layer detection, and served as a core engineer for the Cold Atom Laboratory (CAL) on the ISS, delivering a critical power supply for quantum experiments.

In 2024, I returned to Europe to lead the convergence of space and terrestrial networks at i2CAT. I currently oversee a team of 23 researchers and coordinate the 6GStarLab mission (launched November 2025), which serves as an open in-orbit laboratory for testing 6G protocols and waveforms. My current research focuses on exploiting 6G waveforms for dual-use applications, specifically Integrated Sensing and Positioning, supported by my co-authorship of two US patent applications regarding polarimetric positioning signals. My scientific output includes 39 publications in Q1/Q2 journals (e.g., IEEE TGRS, Remote Sensing of Environment) with an h-index of 21 and over 1,200 citations, and I serve as an Associate Editor for IEEE GRSL. This trajectory confirms my capacity to lead high-stakes technical projects, generate intellectual property, and drive the strategic roadmap for European space communications, moving from the design of specific scientific instruments to the definition of the critical 6G infrastructure that will ensure strategic sovereignty in Space.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: YERA TOLEDO, RACIEL
Referencia: RYC2025-056752-I
Correo Electrónico: ryera@ujaen.es
Título: Building Trustworthy Recommender Systems: Data Foundations, Group Decision Support, Explainability, and Fairness

Resumen de la Memoria:

Raciel Yera has been pioneer in several research lines in AI-based personalization technologies and recommender systems, such as natural noise management, problems recommendation in programming online judges, and preference-based menu recommendations. Currently he works in frontier research topics on explanation and fairness in group recommendation.

His efforts are focused on open problems in recommender systems research and practice, such as:

- 1) Explainability and fairness in individual and group recommendation, through the development of post-hoc explainability approaches, fairness-aware recommendation methods, and in the frame of his ongoing Marie Skłodowska-Curie individual project "Fairness and Explanations in Group Recommender Systems. Towards Trustworthiness and transparency".
- 2) Natural noise management in recommender systems, presenting novel models based on the previous classification of users and items, the development of fuzzy approaches with this goal in mind, its contextualization to group recommendation, or the use of the time dimension.
- 3) Recommender systems for programming online judges, supported by data preprocessing techniques, or using fuzzy tools.
- 4) Food recommender systems, presenting novel approaches for personalized menus recommendation that have as main feature the combined use of nutritional and preference-based information.
- 5) Content-based group recommendation approaches, by formalizing this novel paradigm through an extensive incorporation of item attributes in the profiling phase, the exploration of a meta-learning approach for selecting the more appropriate aggregation schemes, or its use for restaurant recommendations. Eventually, he has explored content-based recommendation in a question-answering context.
- 6) The use of recommender systems to support tourism management.

The line of research to be developed by Raciel in the next future, will be focused on shaping the next generation of human-centred individual and group recommender systems, grounded in three key pillars: controllability, multimodality, and agentic AI. These address fundamental limitations of current recommendation technologies and respond to emerging demands for transparency, collaboration, adaptability, and richer human-AI interactions.

Dr. Yera aims to develop new theoretical and methodological foundations that enable recommender systems to behave in more adaptive, contextual, and socially aligned ways. This agenda is structured around three overarching objectives: O1) designing and evaluating holistic user-control mechanisms for individual and group recommendation; O2) developing robust, explainable, and fair multimodal models for diverse recommendation scenarios; and O3) integrating agentic AI architectures into group recommendation to support reasoning-driven, socially aware co-decision processes.

Resumen del Currículum Vitae:

Raciel is currently a Marie Skłodowska-Curie post-doctoral fellow that is a unique position for developing frontier research. His research is focused on the use of computational intelligence tools to improve not only the performance of social (group) RSs in terms of accuracy and other related metrics, but also improving the explainability and fairness of such methods to fulfil the Ethics Guidelines for a Trustworthy AI, published by the European Commission. His work is published in journals as Knowledge-Based Systems, Decision Support Systems, Applied Soft Computing, Expert Systems with Applications, International Journal of Approximate Reasoning, Applied Intelligence, etc; with relevant authorship position in 80% of his papers (first/corresponding/last author).

His current position as Marie Skłodowska-Curie Post-doctoral Fellow (budget: 183.000€) is grounded on the project "FIDELITY: Fairness and Explanations in Group Recommender Systems. Towards Trustworthiness and transparency". He is also member of the research team in a Proyecto de Generación de Conocimiento 2024 program (ref. PID2024-161073NB-I00) (2025-2028, 60.375€). Main Researcher in 1 Project in the Cuban National Programme funded by Ministry of Informatics and Communications. He participated in 3 other Cuban national research projects. Secretary of ELIGE-IA, the Spanish Network on Recommender Systems Research, funded by the Spanish National Research Agency (Thematic Networks 2022). Organizer of special sessions in several conferences (CAEPIA 2024, FLINS-ISKE 2024, IDEAL 2024). TPC Member of ECAI 2024 and 2025. Local Chair in IDEAL 2025. His research has been focused in concrete e-services, e-learning, tourism, and local government scenarios. He has developed 2 software tools widely used in Cuba by the touristic sector and the Ministry of Higher Education, and co-developed GREX, the first library for explaining group recommendations (<https://github.com/toledomateus/pygrex>, https://doi.org/10.1007/978-3-032-10489-2_9). He worked with Ayesa IT to develop fair e-services RS in the frame of the DRural H2020 project.

Raciel has 17 months of international research stays funded by competitive calls, as an Erasmus Mundus fellowship (2014-2015), a CEATIC fellowship (2017), and a Fundación Carolina fellowship (2021). Visiting researcher at Maastricht University, the Netherlands (2024), Researcher Level III by the National Council of Science and Technology, Perú. In addition he was María Zambrano fellow (2022-2024).

Currently he has ongoing collaborations with research groups from Spain, Cuba, Netherlands, China, and Perú.

He has supervised 15+ BSc/MSc/PhD theses in Cuba, Spain, and Paraguay. Peer-reviewer for 30+ JCR journals (Publons); and reviewer for the DAAD Postdoctoral Program PRIME 2021 (Germany). 1200+ hours of teaching as Associated and Full Professor in Cuba. 18 ECTS of teaching as postdoc in Spain.

Recipient of IFSA Best Journal Paper Award 2017, EUSFLAT Best Technical Paper Award 2023, and FLINS-ISKE Best Paper Award 2024. National Award of Cuban Academy of Science 2020. Best Young Researcher of Univ of Ciego de Ávila 2016 and 2018. Young member of Cuban Academy of Science (2018-2024). Member of Cuban National Technical Committee of Ministry of Higher Education (2019-2022), and Cuban National PhD Examination Committee in Computing (2017-2021).



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones

Nombre: DAS, PROLOY TARAN

Referencia: RYC2025-055011-I

Correo Electrónico: dasproloy2007@gmail.com

Título: Research Assistant

Resumen de la Memoria:

My research career is dedicated to bridging fundamental solid-state physics with transformative sensing technologies. With over 13 years of international experience across India, Switzerland, Israel, South Korea, Austria, and Germany, I have developed a unique expertise in ultra-sensitive magnetic sensors, low-noise electronics, and flexible magnetoelectronics.

My journey began with a Ph.D. in correlated electron systems, providing a deep foundation in material physics. During my postdoctoral work, I pivoted to applied device research, focusing on the Planar Hall Effect (PHE). I was instrumental in pushing PHE sensitivity to world-record levels, achieving sub-picoTesla resolution, and developing robust sensors for harsh environments. This established me as a leader in the magnetoresistive sensor community, culminating in my role as Chair of the IEEE P3599 working group to create the first global standard for PHE sensor characterization.

As a Marie Skłodowska-Curie Principal Investigator, I now lead the frontier of flexible high-performance sensing. My current project, "FlexiMMG," focuses on developing wearable, conformal PHE sensors for portable magnetomyography, aiming to revolutionize neuromuscular diagnostics. My research program systematically integrates material design, noise engineering, and system-level validation to solve real-world problems.

Looking ahead, my research line aims to pioneer "Intelligent Flexible Sensor Systems." This vision involves evolving from single sensors to integrated platforms that combine multi-modal sensing (magnetic, strain, pressure) with on-device machine learning for active noise cancellation and signal processing. The goal is to create autonomous systems for advanced biomagnetic diagnostics and seamless human-machine interfaces, making high-precision sensing accessible outside shielded laboratories and into daily life.

Resumen del Currículum Vitae:

An experimental physicist and MSCA Postdoctoral Fellow with 13+ years of international R&D. Expert in ultra-sensitive magnetoresistive sensors (Planar Hall Effect), flexible magnetoelectronics, low-noise instrumentation, and device integration for biomedical and IoT applications.

Leadership & Funding:

Principal Investigator of a prestigious €189.6k Marie Skłodowska-Curie Fellowship.

Chair of IEEE P3599 Working Group to establish the first international standard for PHE sensors.

Secured ~€330k as PI across multiple international grants (MSCA, PBC Israel, CSIR India).

Scientific Impact:

46+ peer-reviewed publications (Google Scholar: h-index 13, citations 634) in high-impact journals (ACS Nano, APL Materials, IEEE Trans. Magn.).

Pioneered record-setting sensor resolutions: sub-picoTesla (rigid) and sub-nanoTesla (flexible).

Research spans full stack: thin-film fabrication (sputtering, lithography), noise analysis, readout electronics, and prototype validation (e.g., for magnetomyography).

Recognition & Service:

Awards: MSCA-PF (top 9% global ranking), PBC Fellowship (Israel), Visiting Professor (DGIST, South Korea).

Leadership: Secretary, IEEE Magnetics Society Sensors Subcommittee; Guest Editor for Sensors and Micromachines.

Mentorship: (Co-)supervised 8 PhD and 2 Master's students.

Reviewer for 15+ prestigious journals (e.g., IEEE Sensors, J. Appl. Phys., Scientific Reports).

Seeking to establish a leading research group to develop intelligent, multi-modal sensor systems for next-generation healthcare and sustainable electronics.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: KANG , LEI
Referencia: RYC2025-056588-I
Correo Electrónico: lkang@cvc.uab.es
Título: Privacy-Preserving Multilingual and Multimodal Document Intelligence

Resumen de la Memoria:

My research career focuses on advancing privacy-preserving multilingual and multimodal document intelligence, integrating computer vision, machine learning, generative modeling, and trustworthy AI. I have made pioneering contributions in four interconnected areas: handwritten text recognition (HTR), generative handwriting modeling, multimodal document understanding, and privacy-preserving machine unlearning. During my PhD, I introduced the first Transformer-based HTR architecture and the first content-style disentanglement framework, including a Best Paper Award at ICFHR 2020. I later developed GANwriting (ECCV 2020) and the first text-line generative model with content-style control (TPAMI 2022).

More recently, I initiated a new research line on machine unlearning, leading the first works for document classification (ICDAR 2024, oral) and handwritten text recognition (Pattern Recognition 2026). These contributions define a new paradigm for selective data deletion in compliance with GDPR and establish an emerging research direction within document analysis. I have also advanced multilingual and multi-page document VQA, introducing novel memory-based and attention-based architectures, and contributed to medical document analysis through interpretable multimodal LLMs.

My research trajectory is marked by sustained international mobility and leadership. I conducted an industrial research stay at omni:us (Germany), where I contributed to transforming academic models into large-scale commercial systems. From 2021 to 2023, I worked in China as lecturer, founded a new research group (VSPG), and attracted >75,000€ in competitive funding as PI. Currently, I am PI of a Beatriu de Pinós project (152,348€) on privacy-aware multilingual document VQA, and participate in the international DESCRIPT project for historical manuscript decipherment.

The research line proposed for this programme aims to develop a unified framework for privacy-preserving document understanding, covering synthetic data generation, multilingual multimodal modeling, and GDPR-compliant unlearning. The project includes interdisciplinary applications in medicine and digital humanities. Conducted at the Computer Vision Center, this work will establish a long-term research programme that consolidates Spain's leadership in trustworthy document AI.

Resumen del Currículum Vitae:

I am a researcher specializing in document intelligence, machine learning, and trustworthy AI, with contributions recognized internationally through high-impact publications, awards, and competitive funding. I hold a PhD from the Universitat Autònoma de Barcelona and have established a strong publication record as both first author and corresponding author in leading venues such as IEEE TPAMI, Pattern Recognition, ECCV, ICDAR, and ECAI.

My scientific contributions include:

- (1) state-of-the-art architectures for handwritten text recognition, including the first Transformer-based HTR model (Pattern Recognition 2022);
- (2) pioneering generative models for handwriting synthesis, from GANwriting (ECCV 2020) to the content-style aware text-line generator (TPAMI 2022);
- (3) advances in multimodal document understanding, including multi-page DocVQA systems (ICDAR 2024) and interpretable LLM-based medical document analysis (ICDAR 2025);
- (4) the first machine unlearning methods for document classification (ICDAR 2024) and handwritten text recognition (Pattern Recognition 2026), establishing a new research direction on privacy-preserving document analysis.

I have demonstrated leadership through the acquisition of competitive grants as Principal Investigator, including the Beatriu de Pinós fellowship (152,348€) and a national NSFC project in China (~40,000€). I founded and led the Vision and Speech Processing Group at Shantou University, supervised Master's and Bachelor's interns (one awarded excellent thesis among top 10%), and currently co-supervise a PhD student, multiple TFM students, and multiple bachelor interns at the Computer Vision Center.

My international experience includes long-term research stays in Germany (omni:us), a lecturer position in China, and participation in international networks such as the DESCRIPT project for historical manuscript decipherment. I co-organized the NeurIPS 2023 Privacy-Preserving DocVQA Competition, and regularly review for leading journals and conferences (T-PAMI, PR, CVPR, AAAI, ECCV, ICDAR, IUI).

My professional trajectory demonstrates scientific independence, ability to lead multidisciplinary teams, and the potential to consolidate a high-impact research programme in Spain focused on privacy-aware multilingual document understanding, aligned with European priorities in trustworthy and ethical AI.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: SANTIAGO MALAGÓN, SARA
Referencia: RYC2025-054562-I
Correo Electrónico: sara.santiagomalagon93@gmail.com
Título: Novel Materials for the Development of Next-generation Biosensors with Enhanced Performance

Resumen de la Memoria:

My work has focused on the development of sustainable (nano)materials with smart and environmentally friendly properties for application in (bio)sensors. I aim to address the limitations of current systems by enhancing portability with solid materials, flexible microfluidic devices, and wearable platforms; improving stability through biocomponent stabilization and antifouling strategies; and optimizing analytical performance in terms of sensitivity, linear range, and detection limits. I have also incorporated smart functionalities, such as self-powered systems and reusable devices based on molecular switches capable of restoring their initial state after an external stimulus, thereby extending their lifespan. These approaches have enabled the development of systems applicable to enzymatic biosensors and electrochemical and optical immunosensors. Some have shown promising clinical applications, such as glucose detection or the identification of specific biomarkers for the early diagnosis of colorectal cancer. This research has generated new hypotheses on the integration of sustainable smart materials in biosensors, proposing innovative strategies to improve their stability, sensitivity and reusability, and contributing to advances in the field of sustainable bioinspired sensors.

Building on this foundation, my current aim is to create next-generation, clinically relevant biosensing platforms by integrating multifunctional nanomaterials with microfluidic devices produced in cleanroom facilities. The primary goal is to advance the field by bridging advanced materials chemistry with translational biosensing, through the development of robust, reproducible, and scalable devices suitable for clinical applications, while establishing cleanroom workflows to support this effort. This research continues to explore innovative strategies to enhance stability, sensitivity, and reusability, contributing to the broader advancement of sustainable, bioinspired sensor technologies.

Resumen del Currículum Vitae:

I obtained my PhD in Electrochemistry, Science and Technology from the Autonomous University of Barcelona (UAB) in September 2022, carrying out my research at the UAB Physical Chemistry Unit and at the Chemical Transducers Group of the IMB-CNM (Barcelona). The thesis received a Cum Laude with International Mention and was awarded the 9th Antonio Aldaz Prize in 2024 for the best doctoral thesis in electrochemistry, granted by the GEE-RSEQ. During my PhD, I completed a research stay in Professor Luisa De Cola's group at the Mario Negri Institute for Pharmacological Research and the Università Statale di Milano, funded by an Erasmus+ scholarship. After finishing my doctorate, I began my first postdoctoral stage in the Electroanalysis and Electrochemical (Bio)sensors Group (GEBE) at the Complutense University of Madrid (UCM), funded by a Juan de la Cierva fellowship from the Agencia Estatal de Investigación (AEI). I am currently supported by a Marie Skłodowska-Curie Postdoctoral Fellowship in Professor Nicole Pamme's research group at Stockholm University, one of the world's top 100 universities.

Throughout my academic career, I have accumulated a total of 624 teaching hours at both UAB and UCM. My research has generated new hypotheses on the integration of sustainable smart materials in biosensors, proposing innovative strategies to enhance their stability, sensitivity, and reusability, thereby contributing to the advancement of knowledge in the field of sustainable bioinspired sensors. The results of this work have been published in 24 scientific articles, receiving a total of 470 citations (and 13 h-index), and have been presented at 21 conferences, reflecting collaborations with numerous international research groups, companies and institutions.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: GRILO PINHO, ANA LUÍSA
Referencia: RYC2025-054705-I
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Título: Individualized Cognitive Mapping: From Deep Phenotyping to Neurorehabilitation
Resumen de la Memoria:

I am a computational and cognitive neuroscientist whose work integrates multi-task fMRI, machine learning, and individualized modelling to advance precision brain mapping. My research follows two complementary directions: (i) identifying elementary cognitive components using deep behavioral phenotyping; and (ii) developing computational methods for subject-specific functional atlases. Throughout my career, I have contributed to major open neuroimaging resources—most notably the Individual Brain Charting project—where I led three high-resolution dataset releases and co-developed analytical frameworks that extract shared and individual cognitive structure. My publications span dataset papers, development and implementation of encoding models for individual functional atlasing, and foundational work on the neural basis of musical creativity. As a member of the Workgroup for HArmonized Taxonomy of NETworks (WHATNET), an Organization-for-Human-Brain-Mapping working group, I contributed to developing consensus tools for comparing functional network atlases.

Open science is central to my research. I have worked on BIDS-compliant pipelines, task-protocol repositories, and preprocessing workflows used internationally, and I have been an active contributor to Nilearn since 2017. I also contribute to platforms such as HierarchBayesParcel, Functional-Fusion, and Women in Neuroscience Repository (WiNRepo). I have delivered over 20 invited talks and more than 25 poster presentations worldwide, participated in numerous Brainhack editions, and engaged in outreach and public communication through events, media features, and scientific dissemination.

My international trajectory includes research training at the University of Coimbra (Coimbra, PT) and Karolinska Institutet (Stockholm, SE), a postdoctoral position at Inria/NeuroSpin (Paris-Saclay, FR) within the Human Brain Project (HBP), and my current BrainsCAN Tier-I Postdoctoral Fellowship at Western University (London Ontario, CA), where I bridge computational neuroimaging with empirical work in music cognition. I collaborate broadly across global initiatives (e.g. HBP, WHATNET, WiNRepo), review for leading journals, supervise students, and lead a BrainsCAN-funded project on cerebellar plus basal-ganglia mapping in music cognition.

Proposed Line of Research: I aim to translate individualized cognitive mapping into patient-tailored neurorehabilitation at IIS BioBizkaia/Cruces Hospital in Bilbao. My plan is to design compact deep-phenotyping task-fMRI batteries that generate individual cognitive maps, train predictive models of recovery, and integrate clinical, behavioral, and digital-therapy data into a closed-loop system that continuously adapts therapy. I will combine NeuronUP—a widely used digital-health platform—with non-invasive brain stimulation, supported by BIDS-compliant workflows, standardized pipelines, and open documentation. This translational program seeks to deliver a portable framework for network-target selection, adaptive therapy, and cross-site benchmarking, embedding precision cognitive mapping into routine neurorehabilitation practice.

Resumen del Currículum Vitae:

I am a computational and cognitive neuroscientist whose work integrates neuroimaging, machine learning, and individualized cognitive mapping. I am a BrainsCAN Tier I Postdoctoral Fellow at Western University, affiliated with the Western Centre for Brain and Mind (2021–present) as well as the Department of Computer Science (2021–2024) and the Department of Psychology (2024–present). My research combines functional Magnetic Resonance Imaging (fMRI), computational modelling, and systems neuroscience, applying deep behavioral phenotyping to probe higher-order cognition.

I completed a PhD in Health Sciences at the University of Coimbra (PT) in 2015, conducted largely at Karolinska Institutet (Stockholm, SE). My doctoral work yielded major contributions to the neuroscience of music and creativity—including a Journal of Neuroscience paper showing increased premotor–prefrontal connectivity in expert musicians during improvisation—widely covered by international media. My earlier training includes an integrated Master's in Engineering Physics from Instituto Superior Técnico, University of Lisbon (PT).

As a postdoctoral researcher at Inria Saclay/NeuroSpin (2015–2020), I worked on the Individual Brain Charting (IBC) project, one of the first high-resolution, multi-task open fMRI datasets. I led three major IBC releases (Scientific Data 2018, 2020, 2024) and developed a framework for subject-specific functional atlasing (Human Brain Mapping 2021). My work contributed to EBRAINS' multimodal Human Brain Atlas and supported large-scale neuroinformatics initiatives.

At Western University, I have established an independent research program bridging computational neuroimaging and music cognition. I investigate cerebellar and striatal mechanisms of temporal prediction and demonstrated a dissociation between absolute and relative timing across these subcortical regions. I also co-developed the Functional Fusion and the Hierarchical Bayesian Parcellation (HBP) frameworks, advancing individualized brain parcellation through multi-dataset Bayesian integration. This work appears in Imaging Neuroscience (2025), Nature Communications (2024), and my CCN2024 paper.

My scientific output includes 15 peer-reviewed papers (6 first-author, 1 last-author), high-impact datasets, open-source software contributions (Nilearn, SUITPy, HBP tools), and more than 1000 citations (h-index 13). I have collaborated with over 30 international researchers, including investigators at University of California – Los Angeles, McGill, and Stanford, and secured more than \$320k in research funding.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I have given 22 invited talks, numerous conference presentations, and engaged in outreach through the Organization of Human Brain Mapping initiatives and community-science events. I am a co-developer and board member of the Women in Neuroscience Repository and actively promote Equity, Diversity, and Inclusion in academia. I mentor students from diverse backgrounds—namely Computer Science, Neuroscience, and Psychology—hold a University Teaching Certificate, and have taught postgraduate classes on the neural basis of musical improvisation.

Overall, my trajectory reflects continuous contributions to open science, large-scale neuroimaging, precision cognitive mapping, and fundamental cognitive neuroscience in music cognition.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: BAZCO NOGUERAS, ANTONIO
Referencia: RYC2025-054877-I
Correo Electrónico: antoniobazco@gmail.com
Título: Sustainable and Safe Anticipatory Deployment of Edge Computing-based B5G Networks

Resumen de la Memoria:

My research trajectory spans communication theory, mobile networks, and machine learning, with a progressive shift from fundamental limits to system-level network intelligence in realistic environments. I obtained my PhD at Sorbonne University, in collaboration with EURECOM and Mitsubishi Electric R&D, where I studied decentralized and cooperative wireless networks. I derived capacity limits and algorithms for distributed MISO channels with partial channel state information, and later for multi-antenna coded caching, resolving the feedback bottleneck that hindered practical deployment. These works, published in IEEE Transactions on Information Theory and IEEE Transactions on Wireless Communications, clarified how cooperation, caching, and feedback can be combined to boost throughput in emerging cell-free and industrial IoT scenarios.

After my PhD I joined EURECOM as a postdoctoral researcher, where I further explored coded caching in realistic massive MIMO systems and began broadening my focus towards networked systems. This phase consolidated my expertise in information theory while exposing me to performance evaluation and system modelling. I then moved to IMDEA Networks as an independent researcher funded by a competitive [Atracción de Talento Investigador](#) grant (Comunidad de Madrid), which I have used to build my own research line on anticipatory, ML-driven network management and edge computing.

At IMDEA, my work has followed three main, interconnected directions. First, I have developed loss meta-learning frameworks and forecasting-based mechanisms for zero-touch management and network slicing, where predictive models are aligned with operator intents such as profit or energy efficiency. Second, I have proposed green edge-computing solutions that jointly optimize admission, placement, and migration of demanding services under intermittent renewable energy, demonstrating that edge infrastructures can be both profitable and strongly carbon-aware. Third, I have led and co-led measurement-based studies with major operators (Telefónica, Orange) to characterize public-cloud latency and session-level mobile traffic, turning proprietary data into open models and tools that support reproducible research and education.

Throughout this trajectory I have maintained a strong international and collaborative profile: long-term experience in France and Spain, a research stay at UC Irvine on aligned image sets, and a recent stay at the University of Edinburgh to connect forecasting with ML security. I have participated in and helped shape European projects such as the H2020 DAEMON project on network intelligence, where I led a task on the limits of AI and contributed to the design of a transversal Network Intelligence Stratum for 6G. In parallel, I have co-supervised several PhD students, contributed to attracting public and industrial funding, and been active in service (TPC member, organizer of international conferences, outreach and teaching). Taken together, these elements describe a coherent trajectory from theory to deployable, ML-enabled network intelligence grounded in real data and open-science practices.

Resumen del Currículum Vitae:

My research career focuses on the design of intelligent communication networks, spanning their mathematical underpinnings through to their practical deployment. After earning my PhD in Telecommunications from Sorbonne Université in 2019, I completed a postdoctoral appointment at EURECOM and, since 2021, I have served as an [Atracción de Talento 2020](#) research fellow at IMDEA Networks. My work lies at the intersection of information theory, optimization, and machine learning applied to mobile and cloud networking.

My early contributions addressed the fundamental limits of decentralized wireless networks with distributed information, where I derived performance bounds and designed algorithms capable of approaching centralized benchmarks despite relying solely on partial information. I later extended this line of inquiry to communication with memory and distributed computing through coded caching, combining combinatorial techniques with graph-theoretic tools. More recently, my research has shifted toward the development of self-managed, zero-touch networks capable of forecasting their future state via time-series prediction to optimize resource allocation, integrate renewable energy sources, and support immersive applications such as cloud gaming and extended reality.

I have published 11 articles in Q1 journals (including IEEE Transactions on Information Theory, Wireless Communications, and Network and Service Management) and 19 papers in top-tier conferences such as IEEE INFOCOM, ACM IMC, and MobiHoc. My work has accrued more than 260 citations and has been strengthened by extensive international collaboration. I have participated in 11 competitive European and national research projects (including ERC and H2020 initiatives) and I am principal investigator of a [2020 Talent Attraction Grant](#) from the Community of Madrid, in addition to contributing to technology-transfer projects with Telefónica I+D and Mitsubishi Electric. These achievements have been recognized through distinctions such as the COIT Best Master's Thesis Award (sponsored by Orange) and first place in the 2025 DataBri-X Datathon.

In teaching and service, I have co-supervised or mentored seven PhD candidates, delivered approximately 90 hours of instruction in computer networking and cellular networks at Universidad Carlos III de Madrid, and contributed actively to outreach and promotion of telecommunications engineering (including audiovisual materials, technical tutorials, and activities in international conferences). I serve on 11 technical program committees (e.g., INFOCOM, WiOpt), review regularly for Q1 journals and leading conferences (ICLR, ISIT, IFIP Networking), and have been part of organizing committees for international events such as ACM IMC 2024, IEEE SECON 2023, and WiOpt 2023. Collectively, these activities reflect an independent research trajectory with strong international projection, aimed at equipping future 6G networks with native intelligence, adaptive autonomy, and rigorous mathematical foundations.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MAVREDAKIS, NIKOLAOS
Referencia: RYC2025-056769-I
Correo Electrónico: nikolaos.mavredakis@uab.cat
Título: From Device Physics to EDA Tools: Compact Models for Emerging Nanoelectronics

Resumen de la Memoria:

The proposed research line for the Ramón y Cajal program is "Next-Generation Graphene FET Circuit Design Platform (GraFED)", aimed at enabling reliable graphene field-effect transistor (GFET)-based circuit design through physics-based compact models and seamless integration with commercial electron design automation (EDA) tools. CMOS technology is approaching its physical limits due to scaling, while graphene offers exceptional mobility, thermal conductivity, mechanical strength, and flexibility. Although graphene's zero bandgap restricts conventional digital logic, GFETs show strong potential in hybrid CMOS/GFET biosensors, RF/analog circuits, and broadband THz detectors. Their limited transition to integrated circuits (IC) stems mainly from the absence of accurate, scalable compact models. Existing approaches are either too simplistic or too computationally heavy, preventing realistic IC-level design. A robust compact-modeling framework is therefore needed to bridge materials, devices, and circuits and to enable efficient fabrication/design cycles.

This research builds on a unified, physics-based Verilog-A GFET model validated with both industrial and academic technology nodes. The framework has reached technology readiness level (TRL) 5, supported by a modular model, protected intellectual property (IP) and a cloud-based software-as-a-service (SaaS) prototype licensed by Graphenea. GraFED will extend this foundation to TRL 7, enabling robust circuit design for biosensing, RF, and THz applications. The work includes adding key physical effects (temperature, reliability, aging), refining parameter-extraction pipelines, validating the model with comprehensive experimental datasets, deploying a beta SaaS platform, ensuring interoperability with Cadence and Keysight EDA tools, and benchmarking representative GFET circuits.

The project will be carried out by me as principal investigator, supported by a PhD and Master students. Early work will formalize and implement the required model extensions. From years two to four, at least one industrial GFET process and several advanced academic architectures will be characterized, measuring more than 30 devices per footprint across DC, transient, RF, and noise conditions. These datasets will guide iterative calibration cycles until the model reaches better than 10% deviation. Later, at least three representative industrial reference circuits will be benchmarked, and a validated model library for biosensing and RF/THz applications will be completed and packaged with reproducible design guidelines.

In parallel, a beta cloud-based SaaS platform with multi-user access will be deployed and tested by at least five external users. The GFET design tool will be integrated into at least two commercial EDA environments, enabling full design-flow demonstrations and providing documentation for adoption. An updated IP strategy will be implemented, including at least one new application. A feasibility analysis and technology roadmap will guide uptake, while licensing and collaborations will be pursued to secure at least two additional agreements with industrial or research partners. Together, these developments will deliver a complete modeling and design ecosystem supporting reliable predictions, reproducible workflows, and accelerated adoption of graphene electronics across academic and industrial environments.

Resumen del Currículum Vitae:

I received my Diploma (2006), M.Sc. (2010), and PhD (2016) degrees from the Technical University of Crete, Greece. My doctoral work focused on the development of physics-based compact models describing low-frequency noise (LFN) and its statistical variability in advanced CMOS devices. These models were validated with state-of-the-art technologies, contributed to improving RF CMOS circuit performance, and were integrated into the industry-standard EKV compact model.

From 2010 to 2017, I was a core member of the EKV compact-modeling team, specializing in IV, RF, and noise characterization. I collaborated with several semiconductor companies, conducting EKV model extraction for advanced technology nodes and participating in invited research internships. During this period, I also supported teaching activities, co-supervised theses, and lectured Master-level courses.

Since 2017, I have been a postdoctoral researcher at the Autonomous University of Barcelona, funded initially by a Marie S. Curie fellowship and later by major European initiatives (Graphene Flagship). My research focuses on the characterization and compact modeling of emerging graphene and 2D material FET technologies. GFETs show strong potential in RF/analog circuits, biosensing, and THz detection, while 2D-FETs also support low-power digital electronics. I am co-inventor of the patented "Graphene transistor/2D FET Toolbox", and have led the development of physics-based compact models for LFN, high-frequency noise, geometrical effects and variability in GFETs and 2D-FETs, implemented in Verilog-A and validated across diverse experimental datasets. I have also established parameter-extraction methodologies for IV, LFN, and small-signal behavior, providing circuit designers with clear and reliable device metrics. My work includes detailed investigation of interface traps in GFETs and modeling their impact on electrical characteristics.

Our group is developing the first commercial GFET compact-model SaaS platform, for which I have led characterization, and compact modeling efforts. I played a key role in securing its first industrial licensing agreement. I have actively engaged with multiple industrial and academic stakeholders to promote adoption of our tools, identify new research needs, and guide the transition of our modeling software into broader use. I have also coordinated collaborations with several research institutions, overseeing both experimental validation and modeling activities.

I have authored or co-authored over 40 peer-reviewed publications, serving as corresponding author for all my first-author works since completing my PhD. I contribute widely to the scientific community as a reviewer for major journals and take an active role in graduate education. I have lectured in prestigious Master programs, participated in PhD thesis evaluation committees, presided over Master thesis defenses, and currently supervise and mentor graduate students. I will also serve as PhD supervisor for a new doctoral position in our group.

Overall, my career demonstrates a solid record of scientific leadership, technology transfer, and international collaboration. My work bridges fundamental device physics with compact modeling and practical circuit design, contributing to the advancement of nanoelectronics and the industrial uptake of 2D-material-based technologies.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: GROSSE, KATHRIN
Referencia: RYC2025-055938-I
Correo Electrónico: kathrgrosse@gmail.com
Título: Practical AI security and AI security Incident Reporting

Resumen de la Memoria:

At the start of my PhD, I co-authored a high-impact paper on the security of neural network-based malware classifiers (Google Scholar: 787 citations; Scopus: 435; among the top 1% most cited). From there, I broadened my scope to computer vision and spam detection, as well as Gaussian Processes and Bayesian Neural Networks, which enabled me to tackle macro-level research on the practical relevance of AI security and the operational research gap. Our first joint study on professional perceptions attracted interest from industry (e.g., Berlin's Safe & Secure AI Community and DEKRA) and public bodies such as Germany's BSI.

In my first postdoc at the university of Cagliari, Italy; I integrated results on training-time attacks. In the second, at EPFL in Switzerland, I worked on threat modeling for autonomous vehicles. In parallel, we documented real AI security incidents, analyzed and published them; upon identifying limitations in anonymous data, we proposed a structured scheme for reporting AI security incidents. I now collaborate with MITRE, ETSI, and CENELEC to incorporate this work into standardization aligned with the EU AI Act's reporting requirements.

My recent work takes the first steps toward collecting AI security incidents and protecting AI in practice. From this, my long-term goal is threefold:

A. Measure real risks and attack prevalence to understand attack surfaces and adversary profiles. We collaborate with MITRE and the AI Incident Database to build a European repository complementing high-risk requirements; while reaching critical mass, surveys and interviews assess real AI use and exposure, and domain-specific threat modeling (e.g., medicine) gathers key data (model size, access, preprocessing, pipeline). These cases improve reporting schemes and data quality.

B. Develop case-based security by analyzing concrete applications and constraints to derive effective mitigations. We have shown that application context shapes vulnerability (e.g., autonomous vehicles and GNNs for power grids). With the Linux Foundation Energy, we captured practitioner concerns, built threat models, ran ablation studies to profile adversary capabilities, derived best practices, and explored defenses; we will continue with new applications and refine domain-specific guidance.

C. Pursue a holistic vision integrating legal, economic, and human factors, including incentives and voluntary incident reporting. We will investigate IP protection, the economics of AI security, and usable security/HCI for training and tools that minimize reporting effort and increase data for part A.

Given the scope, I will seek funding for PhDs and postdocs. I have submitted an ERC Starting Grant (October 2025, under review) and plan further proposals. The Ramón y Cajal grant will allow me to start my group, consolidate my research line, and make a strong contribution to the community.

Resumen del Currículum Vitae:

I am a researcher specializing in AI security, with a strong track record in technical innovation and community leadership. My work spans adversarial learning, secure AI systems, and practical risk assessment, combining technical depth with human-centered approaches. I have published 24 papers in peer-reviewed international journals and proceedings, with over 3,200 citations (Google Scholar; h-index: 15, i10-index: 23).

I actively contribute to the scientific community: I review for top-tier conferences and workshops and have co-organized several international events. As treasurer of SatML (4th edition), I supported the main organizer of SatML 2025 and together we secured funding that enabled student travel; I co-organized three editions of New Frontiers of Adversarial Machine Learning Workshop (at NeurIPS (2024) and ICML (2022 and 2023)) and currently co-organize a Dagstuhl Perspectives Workshop. I was an invited ACM member (2024-2025) and, since September this year, am a member of ELLIS. My training includes scientific writing and presentation workshops, an intensive course on research management, and a proposal-writing clinic. I witnessed the founding of the CISPA Helmholtz Center for Information Security and participated in hiring committees and a student hearing for initial funding evaluation.

Scientific output and impact: I have published in top-tier venues, with highly cited work ranked in the top 1-10% most influential according to Scopus. Highlights include:

- Wild Patterns Reloaded: A Survey of Machine Learning Security against Training Data Poisoning (ACM Computing Surveys, 2023), with over 220 citations and among the top 1% (Scopus).
- Machine Learning Security in Industry: A Quantitative Survey (IEEE TIFS, 2023), ranked in the top 10% cited papers (Scopus).
- Adversarial Examples for Malware Detection (ESORICS, 2017), with over 1,200 citations (Google Scholar) and in the top 1% cited papers (Scopus).

Mentorship is central to my career. I was guided by leading researchers such as Prof. Michael Backes (CISPA), Prof. Battista Biggio (Univ. Cagliari), and Prof. Alexandre Alahi (EPFL). I have also worked with 4 PhD students, 3 master's, and 3 bachelor's students, several now in prominent positions (e.g., Antonio E. Cinà, professor at Univ. Genoa; Xaver Fabian, PhD student at CISPA). My professional network spans academia, industry, and research centers in Europe and the Americas.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Projects and technology transfer: I have contributed to projects funded by European and national programs (COMET, BMBF), secured mobility grants, and organized conferences with external support (e.g., €25,000 from Novo Nordisk for SatML). My work has had industrial impact: consulting contracts with DEKRA and JRC on security and ethics in autonomous vehicles, contributions to ETSI and CEN CENELEC standards in 2025, and open-source development (Adversarial Robustness Toolbox, >2 million downloads). I am the lead inventor of a patent on risk assessment for machine learning models (US Patent 11,494,496, cited 17 times).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MATIC , SRDJAN
Referencia: RYC2025-054906-I
Correo Electrónico: servs@posteo.org
Título: Data-driven Techniques for Assessing the Privacy and Security of Digital Infrastructures

Resumen de la Memoria:

My research focuses on security, privacy, and Internet measurement, aiming to improve software systems through empirical, automated, and reproducible analysis. I design novel testing and auditing techniques, implement them in open-source tools, and apply them to large-scale studies to provide real-world evidence of systemic vulnerabilities.

A central theme of my work is privacy, where I developed methods to extract sensitive information from systems intended to be untraceable. I designed a framework to locate Tor hidden services and another to reveal IP addresses of Tor bridges, critical components used daily by millions of users. These studies demonstrated that publicly accessible data enables large-scale deanonymization using minimally invasive techniques, highlighting that protocol-level security alone is insufficient. My findings informed design changes in Tor's network statistics pipeline, and I coordinated responsible disclosure with developers, demonstrating real-world impact and research leadership.

At UCL, I initiated research on IoT-based botnets as co-PI of a PETRAS-funded project, identifying IoT malware characteristics and informing the UK National Cyber Crime Unit. At IMDEA Networks, I co-developed the first framework for analyzing intra-household smart device interactions, which led to technical, regulatory, and standardization mitigations, and contributed to the introduction of a new Android permission.

At TU Berlin, I studied legal compliance and privacy in web and IoT ecosystems, developing scalable methods to map IoT backend providers. In web privacy, I created Pythia, an open-source system for detecting third-party services and GDPR-sensitive content. I also developed the first Internet-scale classifier for GDPR-sensitive URLs, revealing widespread tracking of sensitive content and supporting regulators and service providers with auditing tools.

In malware and threat intelligence, I co-designed a platform to extract Indicators of Compromise (IOCs), and I lead an industry collaboration that resulted in the first systematic study of database ransomware attacks, combining large-scale scans with proprietary industrial data to identify ransomware groups targeting Internet-exposed databases, supporting early detection of malicious activity.

My future research aims to develop scalable, reproducible, and deterministic frameworks to study client-side privacy, IoT, and web ecosystems. I will design environment-agnostic methodologies to capture, emulate, and replay real-world interactions across heterogeneous software and hardware setups, enabling systematic evaluation of vulnerabilities, privacy leaks, and protocol behavior. This work will span three layers: the end host (tracking data flows and interactions), the local network (black-box testing and stimulation), and the Internet (mapping and replaying third-party services).

The ultimate goal is to deliver tools and frameworks that allow researchers, regulators, developers, and end-users to rigorously evaluate and enhance the privacy, security, and resilience of modern digital systems, ensuring transparency, reproducibility, and trust in increasingly interconnected software ecosystems.

Resumen del Currículum Vitae:

My research focuses on security, privacy, and Internet measurement, with a strong emphasis on data-driven methodologies. I develop novel techniques to analyze complex systems and implement them in open-source tools that provide real-world evidence of privacy and security issues, supporting both end-users and service providers in evaluating risk-benefit trade-offs.

In anonymity networks, my work demonstrated that robust protocols alone do not guarantee privacy, highlighting the importance of implementation and deployment factors. This research led to concrete improvements in the Tor Project's network statistics, benefiting millions of users. In the Web ecosystem, I developed methods to monitor application evolution, assess service deployment, and detect regulatory compliance violations. I was the first to investigate privacy-invasive practices on governmental websites, releasing frameworks to detect third-party dependencies and sensitive content, directly supporting policy discussions and providing practical tools for legislators and operators.

In mobile and IoT systems, my investigations led to real-world impact, including bug bounties from major technology companies and the introduction of a new Android permission. Across nine research projects, twice as Principal Investigator, I have conducted research stays at five national and international centers across four countries, resulting in seventeen peer-reviewed publications, twelve in ICORE A/A* venues, and fostering long-term collaborations with leading institutions including Max Planck Institute for Informatics, UCL, Boston University, IMDEA Networks, TU Delft, and UC Berkeley.

I have collaborated with interdisciplinary teams, broadening my technical expertise and strengthening my mentorship skills. I have supervised seven theses (four MSc, three BSc), five of whose students are now pursuing PhDs, including the Master's thesis awarded the 2024 SISTEDES Prize for Best Thesis in Software Engineering, and co-supervised a PhD with Narseo Vallina-Rodriguez.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

I regularly present my work at top-tier international conferences and maintain all tools as open-source, ensuring reproducibility and facilitating follow-up research. My work has received international media coverage (The Register, El País, Wired) and I actively participate in public science outreach, including Jornadas Nacionales de Investigación en Ciberseguridad and the European Researchers' Night.

I have taught seven university courses, served as Teaching Assistant in five others, and since 2022 hold the Venia Docendi from UPM. In 2014, I contributed to a MOOC on malicious software with over 40,000 participants.

I have served on Technical Program Committees for leading conferences (USENIX Security, ACSAC, RAID, NDSS), reviewed for prestigious journals (IEEE TIFS, ACM TOSEM), and received awards for these services (ACSAC 2024, RAID 2023). Additionally, I served as publication chair for CoNEXT, registration chair for IMC, reviewed research proposals for the University of Padova, and served on a PhD committee at Universidad Carlos III de Madrid.

My contributions have been recognized with the "Best Work in Progress" award at JNIC 2022 and the R3 certification from the Agencia Estatal de Investigación since 2023, reflecting both the scientific and societal impact of my research.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: RODRÍGUEZ RODRÍGUEZ, ÁLVARO
Referencia: RYC2025-057226-I
Correo Electrónico: alvarordrg@gmail.com
Título: Scalable moiré photonics based on 2D materials

Resumen de la Memoria:

My research trajectory brings together nanofabrication, nano-optics and two-dimensional materials to engineer light-matter interactions at the nanoscale. I obtained my PhD at IEM-CSIC, where I introduced advanced synchrotron methods (GIWAXS, GISAXS, STXM, RSoXS) to investigate laser-induced nanostructures in semiconducting polymers. I demonstrated in situ X-ray monitoring of LIPSS formation and fabricated the first solar cell incorporating LIPSS-engineered layers. My thesis received the AUSE award for the best PhD using synchrotron radiation. I also co-developed an international patent for a conductive-AFM calibration standard and expanded LIPSS nanofabrication to non-absorbing polymers, establishing a versatile framework for laser-based structuring of soft matter.

During my postdoctoral stage at the Heyrovský Institute in Prague, I shifted toward nano-optics and 2D materials. I established a fully operational TERS and TEPL platform, including plasmonic tip fabrication. I led its scientific operation, training and daily optimization. Using this system, I achieved stable and reproducible TERS measurements at room temperature and applied them to a broad range of TMDCs and heterostructures, generating several publications and positioning TERS/TEPL as a central capability within the group. In parallel, I contributed to developing gold-assisted exfoliation and deterministic transfer of large-area monolayers, providing a scalable and high-quality fabrication route that is now widely adopted for integrating 2D materials into optoelectronic and photonic devices.

As a MSCA Fellow at ICMM-CSIC, I launched an independent research line focused on strain engineering of moiré systems. I demonstrated highly efficient strain transfer in TMDCs exfoliated on gold, a key step for achieving reproducible strain-tunable devices. I designed and implemented a miniaturized AFM-compatible strain platform for in situ mechanical actuation, enabling nanoscale mapping of strain-property relationships. More recently, I have focused on producing large-area moiré superlattices, pushing these systems well beyond the micrometer scale.

My future research program aims to establish scalable moiré photonics, integrating gold-assisted exfoliation, programmable heterostrain, and advanced nano-optical spectroscopy (Raman, PL, TEPL, TERS) to develop ultrathin photonic elements based on 2D materials.

Resumen del Currículum Vitae:

I hold a PhD in Chemistry from UCM conducted at IEM-CSIC, where I specialised in the nanostructuring of semiconducting polymers and in the use of AFM and synchrotron techniques to study their morphology and optoelectronic properties. During this period, I introduced advanced X-ray and AFM methodologies into my group, carried out international research stays in Munich, Berkeley and Milan, and established a strong background in nanofabrication and X-ray scattering techniques.

I then moved to the Heyrovský Institute in Prague for a four-year postdoctoral stage, where I shifted my focus toward two-dimensional materials and nanoscale optical spectroscopy. There, I implemented a TERS/TEPL laboratory and became responsible for its operation, training and methodological development. This period allowed me to consolidate expertise in nano-optics, AFM-based techniques, Raman spectroscopy and the fabrication of 2D materials. I also contributed to establishing gold-assisted exfoliation and deterministic stacking as reliable methods for obtaining high-quality, large-area TMDC monolayers.

As a Marie Skłodowska-Curie Fellow at ICMM-CSIC in Madrid, I initiated an independent research line centred on strain engineering and the photonics of moiré heterostructures. I worked on improving strain transfer in flexible 2D devices, developing strain-application platforms compatible with AFM, and studying reconstructed moiré patterns through Raman, PL and AFM techniques.

Currently, at IFIMAC-UAM within the ERC project Heat2Defects, I am extending my expertise toward thermal transport, nanoscale Raman thermometry and defect engineering in 2D materials, participating in the development of next-generation TERS instrumentation for nanoscale heat transport studies.

Across all institutions, I have contributed to building new experimental capabilities, transferring advanced techniques to research groups. I have published 27 papers, including several as first and corresponding author, and maintain an active network of international collaborators.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: SU, LIJUAN
Referencia: RYC2025-054739-I
Correo Electrónico: lijuan.suri.su@gmail.com
Título: Innovative microwave sensors for wearable healthcare and structural health monitoring applications

Resumen de la Memoria:

Dr. Lijuan Su has over a decade of experience in microwave engineering, specializing in the design and development of high-performance microwave sensors for material characterization, biosensing, and industrial applications. Her scientific career began with an M.Sc. in Circuits and Systems at Wuhan University of Technology (WHUT, China) from 2010 to 2013, where she earned a full scholarship and the Outstanding Master Thesis Award. She then obtained a highly competitive Ph.D. scholarship from the China Scholarship Council and pursued her doctorate in CIMITEC research group at Universitat Autònoma de Barcelona (UAB) from 2013 to 2017. Her doctoral thesis, entitled "Transmission Lines Loaded with Electrically Small Resonators: Modeling, Analysis, and Applications to Microwave Sensors", received Cum Laude and the Extraordinary Doctorate Award from UAB. Following her Ph.D., Dr. Su expanded her expertise at the Flexible Electronic Research Center, Huazhong University of Science and Technology (HUST, China), where she led three competitive projects as Principal Investigator, securing total funding of 46k €. Her research (2017-2019) focused on flexible and stretchable microwave sensors for wearable healthcare monitoring and strain detection, resulting in one journal publication, two patents, one utility model, and co-supervision of two master's theses. Since 2020, Dr. Su has consolidated her research at CIMITEC-UAB through a Juan de la Cierva-Incorporación fellowship and subsequent postdoctoral contracts, contributing to high-impact projects and technology transfer actions with industry. Her work advanced microwave sensors for dielectric characterization of liquids, integration with microfluidics, and real-time monitoring in industrial processes such as intelligent sensing systems for wine production and corrosion detection in urban infrastructures.

Leveraging this professional path, Dr. Su aims to establish an independent research line focused on innovative microwave sensors for wearable healthcare and structural health monitoring, integrating advanced materials, novel fabrication techniques, flexible electronics, and IoT connectivity. (1) Microwave sensors for wearable healthcare monitoring. This subline targets flexible, ultra-sensitive microwave sensors integrated into textiles and stretchable substrates for real-time monitoring of body fluids (sweat, urine, glucose) and physiological signals (respiration, pressure, joint flexion). (2) Microwave sensors for advanced structural health monitoring. This subline will develop embedded and non-invasive microwave sensors for monitoring critical parameters (moisture ingress, micro-cracks, delamination) in civil infrastructures. The proposed research line represents a clear evolution from previous work on rigid substrates and laboratory-scale validation toward application-oriented solutions with strong potential for industrial implementation. Its expected impact spans scientific advancement, technological innovation, and societal benefits, contributing to preventive healthcare, safer infrastructures, and smart cities.

Resumen del Currículum Vitae:

Dr. Lijuan Su is a researcher specializing in advanced microwave sensors and circuits for a wide range of applications, with a particular focus on biosensing for which she held key responsibility in CIMITEC group (Centre d'Investigació en Metamaterials per a la Innovació en Tecnologies Electrònica i de Comunicacions) within the Department of Electronic Engineering at Universitat Autònoma de Barcelona (UAB). She received the B.S. degree in Communication Engineering in 2005 and the M.Sc. degree in Circuits and Systems in 2013 from Wuhan University of Technology (WHUT, China), earning a full scholarship and the Outstanding Master Thesis Award. In 2013, she obtained a competitive Ph.D. scholarship from the China Scholarship Council and completed her doctorate at UAB in 2017. Her thesis was awarded Cum Laude and the Extraordinary Doctorate Prize. From 2017 to 2019, she worked as a postdoctoral researcher at the Flexible Electronics Research Center, Huazhong University of Science and Technology (HUST, China), where she led three competitive projects as Principal Investigator, securing funding 46k €. Her research focused on flexible and stretchable microwave sensors for wearable healthcare monitoring and strain detection, resulting in two patents, one utility model, one journal publication, and co-supervision of two master's theses. Since 2020, Dr. Su has consolidated her research at CIMITEC-UAB through a Juan de la Cierva-Incorporación fellowship and subsequent postdoctoral contracts, leading a research topic on advanced microwave sensors with enhanced performance for biosensing applications. Her work advanced sensors for dielectric characterization of liquids, integration with microfluidics, and real-time monitoring in industrial processes, including intelligent sensing systems for wine production and corrosion detection in urban infrastructures.

Dr. Su has participated in 11 competitive research projects, serving as PI in 3, and contributed to 3 projects with industrial partners, 5 R+D+i contracts, 2 patents, and 1 utility model. She has published over 70 scientific contributions, including journal articles, conference papers, 1 book chapter, and 1 book "Planar Microwave Sensors" (Wiley/IEEE Press, 2022). Her research has received more than 2,500 citations (h-index 26), and she actively serves as a reviewer for leading journals such as IEEE Transactions on Microwave Theory and Techniques, IEEE Sensors Journal, and Sensors. She holds accreditation as Tenure-Eligible Lecturer (AQU Informe de Lector) and was elevated to IEEE Senior Member in 2025 for her significant contributions to RF and microwave engineering.

Her career demonstrates leadership and independence through project management, technology transfer, and mentoring activities. She co-supervised two master's theses, one awarded Outstanding Thesis at HUST, and has contributed to industrial collaborations and dissemination through invited talks and international conferences. Dr. Su's future goal is to establish an independent research line in advanced microwave sensing technologies for wearable healthcare and structural health monitoring, integrating flexible electronics, novel materials, and IoT connectivity to deliver innovative solutions with societal impact.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: TITOS LUZÓN, MANUEL MARCELINO
Referencia: RYC2025-055744-I
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Título: Titos_Luzón_RyC2025.pdf

Resumen de la Memoria:

I have a 11 years of research experience at the intersection of Artificial Intelligence (AI) and Volcanology, specializing in Probabilistic Volcanic Hazard Assessment (PVHA) and advanced methods for detecting and classifying volcano-seismic signals. My work has been pivotal in developing computational models to evaluate the impact of ash-forming eruptions on air traffic and creating automatic recognition systems for real-time seismic monitoring.

During my PhD at UGR, I developed two automatic recognition systems for volcano-seismic events. The first supported volcanic risk assessment through event classification, while the second enabled continuous real-time monitoring, significantly enhancing the operational capabilities of volcano observatories.

In my postdoctoral period at the Icelandic Meteorological Office (IMO), I contributed to three European projects (ChEESE, EPOS-SP, and DT-GEO), focusing on High-Performance Computing (HPC)-based workflows for Probabilistic Volcanic Hazard Assessment. My work included developing volcanic plume models (focused on the potential impact of the airborne tephra dispersion and concentration at different flight and ground levels, as well as the evolution of the eruptive plume) to support aviation services such as VAACs, airlines, and air navigation companies. I contributed during the Fagradalsfjall eruption (2021) highlighted my expertise in geophysical data analysis, including the use of Lidar, satellite imagery, and ground-based instruments for hazard assessment.

Currently, my leadership has led to my selection in UGR's Research Projects Program for the Incorporation of Young Doctors into New Research Lines. This competitive program aims to advance frontier research at UGR by supporting the establishment of innovative projects led by young researchers who have successfully completed their postdoctoral specialization in strategic areas. Here, I am developing my own research line in collaboration with the University of Maryland and NOAA, focusing on forecasting and dispersion of harmful particle concentrations in air quality related to large wildfires applying advanced Numerical and AI models. This research line has allowed me to draft a Marie Curie Global proposal obtaining 94/100 points. Additionally, I continue exploring Distributed Acoustic Sensing (DAS) technology as an innovative tool for volcanic monitoring and urban mobility analysis using self-supervised machine learning to improve the monitoring performance in complex contexts and with limited data.

My research period has resulted in more than 28 peer-reviewed publications (3 more under review) and several major conference contributions, consolidating my expertise and expanding my international network of collaborators. This experience has reinforced my leadership skills and independent research capabilities.

My multidisciplinary trajectory combines AI, volcanology, and environmental monitoring, advancing both scientific understanding and practical applications in hazard assessment, public safety, and environmental sustainability.

Resumen del Currículum Vitae:

I have 11 years of research experience in Artificial Intelligence (AI) and Probabilistic Volcanic Hazard Assessment (PVHA) methods. My research works include quantitative PVHA for evaluating the impact of ash-forming eruptions on air traffic and developing automatic recognition systems to monitor and analyze volcano-related seismic activity. I have created 2 automatic seismic recognition systems and 3 long-term PVHA using High-Performance Computing (HPC), resulting in 28 publications (8 as the first author, most in Q1, and 3 more under revision) and over 25 conference contributions.

During my PhD, I developed early warning systems for volcanic eruptions through advanced analysis of volcano-seismic signals. I implemented two AI-based systems: one for classifying volcano-seismic events, aiding event counting and risk assessment, and another for real-time analysis of continuous data streams. Both systems have proven effective in dynamic monitoring frameworks, facilitating their adoption by volcano observatories (Canary Island, Colima, Antarctica). These works have served as a starting point for future studies and doctoral theses.

In my postdoctoral work at the Icelandic Meteorological Office (IMO) within the European ChEESE project, I focused on computational volcanology using HPC for long-term PVHA. This included modeling ash dispersal and concentration at various flight levels and ground surfaces, as well as the evolution of eruptive columns. These studies, applied to volcanoes such as Jan Mayen (Norway) and Neapolitan volcanoes (Italy), are critical for aviation safety and civil protection. I gained expertise in handling meteorological data and geophysical instruments such as Lidar, Radar, spectrometers, and satellite images. Additionally, I contributed to the pre- and syn-eruptive monitoring of the Fagradalsfjall volcano (Iceland, 2021), processing Lidar data, webcams, and modeling ash/gas dispersion and lava flows.

Currently, as a postdoctoral researcher at UGR, I collaborate with IMO on different projects focusing on automatic forecasting and atmospheric dispersal of volcanic SO₂. Here, at UGR I continue working on the detection and classification of volcano-seismic signals and urban mobility patterns using advanced artificial intelligence, signal processing methods and applying Distributed Acoustic Sensing (DAS) data. Additionally, I am launching my own research line in collaboration with the University of Maryland, focusing on forecasting and dispersion of harmful particle concentrations in air quality related to large wildfires.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Other contributions include managing the seismic network on Deception Island during the XXX Spanish Antarctic Scientific Expedition, participating in the TOMO-ETNA experiment (2014, Italy), and supervising students (3 undergraduate, 1 master's, and 3 PhD students – 2 ongoing and 1 completed with cum laude). I am also a reviewer for over 7 scientific journals (mostly Q1), co-convener of the ESS12.10 session at EGU (2019), and Guest Editor of two special issues in Frontiers in Earth Science.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MASVIDAL CODINA, EDUARD
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Correo Electrónico: eduard.masvidal@icn2.cat
Título: Advanced Biomedical Micro-nanotechnologies

Resumen de la Memoria:

The ability to monitor and modulate our body with high precision is key for the treatment of a multitude of diseases and injuries. These capabilities have been long exploited by the MedTech industry to develop bioelectronic recording and stimulation devices that have been vital to human health and have improved our quality of life, such as pacemakers and cochlear and deep brain stimulation implants, to name the most successful examples. More than 1 million people are implanted yearly world-wide. However, current commercial devices face several limitations such as rigidity of the used materials and low number of active sites, which limits their operational life (often requiring reimplantation) and hampers their applicability to more complex medical conditions.

My research career is focused on developing advanced biomedical devices that benefit from the high-resolution fabrication processes of the microelectronics industry and the unique material properties of nanomaterials. I have pioneered the development of flexible microfabricated neural interfaces based on graphene resulting in devices that are gold-standard for DC-coupled electrophysiology recording, and that allow high-precision neural stimulation.

The RYC line of research to be developed fits in the nano-neurotechnology field and can be structured in five main lines of action towards next-generation neural interfaces: i) Improved stability and conformability; ii) High-performance; iii) Higher resolution, iv) Multimodal interfaces and v) In vivo validation and clinical translation. My research line is expected to lead further scientific insights, formation of young researchers, intellectual property protection activities and technology-transfer to existing companies or creation of new ones, and ultimately, to the benefit to health and quality of life of people suffering from neuro-related brain diseases, injuries, and disabilities.

Resumen del Currículum Vitae:

I am a Senior Postdoctoral Researcher with over 10 year (4.5 after PhD) expertise in the fields of microfabrication, nanomaterials and pre-clinical neurotechnologies. My research focuses on the use of the unique properties of nanomaterials in combination with the high-resolution capabilities of clean-room microfabrication, applied towards the development of advanced neural interfaces. My main scientific achievements are: i) pioneering the development of a novel generation of flexible neuroelectronic interfaces based on graphene that allows unprecedented recording quality of neural signals such as brain tsunamis, important for the diagnosis and treatment of brain injury, stroke or epilepsy; and ii) development and pre-clinical validation of a high-precision neuromodulation technology based on nanoporous graphene allowing improved motor rehabilitation for Parkinson's disease or spinal cord injuries, and vision restoration through retinal implants. The scientific relevance of the research is evidenced by high-impact publications (23 in total: 1 Nature Materials, 2 Nature Nanotechnology, among others) and awards (PIONER from Generalitat de Catalunya, EMBO, Boehringer Ingelheim, etc.). My research has also raised industrial interests, evidenced by the innovation and tech-transfer activities (3 patents and 1 industrial secret), licensed to international med-tech companies and start-ups.

I am currently Senior Researcher at the Advanced Electronic Materials and Devices (AEMD) group at the Catalan Institute of Nanoscience and Nanotechnology (ICN2), I am associate researcher of the GBIO group of CIBER-BBN and associate researcher of the Neuroscience Institute (INc) at Universitat Autònoma de Barcelona (UAB). I collaborate with world-leading researchers at national (CSIC, ICFO, IFAE, Hospital Clinic, etc.), international institutions (imec, Fraunhofer, University College London, Paris Vision Institute, etc.) and with leading med-tech industrial partners such as gtec, MultiChannel Systems or Boston Scientific.

I have a leading research role as evidenced by being work package leader in several international projects (Minigraph and Rescuegraph), and I have experience as Principal Investigator in national projects. Moreover, I am director of 3 PhD students in Material Science and Electronic Engineering fields. My research has appeared in leading Spanish newspapers (el Mundo, ABC, La Vanguardia) and TV. And I have contributed to the creation of several datasets, scientific simulation routines and libraries deposited in open-access repositories (Zenodo or CORA).

I act periodically as Reviewer for different scientific journals, and I am organizer of national and international congresses. I am founder of an NGO about Nanoscience and Nanotechnology (SCN2) and have acted as Member of the Governing Board through which I organize events for the transfer of knowledge to the society.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: RUIZ DOLZ, RAMON
Referencia: RYC2025-055724-I
Correo Electrónico: ramonruiz.dolz@gmail.com
Título: Computational Argumentation for the Automatic Analysis of Argumentative Discourse and Human Persuasion

Resumen de la Memoria:

My research trajectory centres on advancing computational argumentation, argument mining, and the analysis of natural language reasoning. I began by introducing some of the earliest Transformer-based models for identifying argumentative relations, implementing and evaluating multiple architectures and establishing a line of work that became widely cited and broadly adopted.

I then led the creation of large, multilingual argumentative corpora. With VivesDebate, I coordinated collaborators and an annotation team across institutions to produce the largest corpus of its kind, and later expanded it into VivesDebate-Speech, the first multimodal argumentative resource in Catalan. This allowed me to combine argument mining with speech processing, producing new multimodal models and demonstrating my ability to lead research independently of supervision. This data was leveraged to propose a neuro-symbolic framework that combined argumentation semantics with graph neural networks to predict debate winners. This direction culminated in a series of A* conference publications and high-impact (i.e., Q1-2) journal papers. In parallel, I explored persuasive human-computer interaction, designing user-aware argument generation techniques for online privacy. I collected and modelled hundreds of user preferences over argumentative reasoning patterns and proposed an argumentation-based system to prevent privacy violations in online social networks.

As a Postdoc, I extended my research into the automatic identification of argumentation schemes. I created QT-schemes, the largest corpus of its kind, along with synthetic resources for pre-training, and demonstrated for the first time that scheme families can be identified reliably with limited dialogue data. During this period, I also contributed important tools to the community such as the Open Argument Mining Framework, where I implemented different modules for several key argumentative tasks.

My most recent work examines the reasoning capabilities of LLMs. I co-designed ART, the first benchmark dedicated to testing argumentative reasoning in LLMs, revealing that models often fail to understand complex argument structures. I have also begun supervising interdisciplinary work at the intersection of culture, interpretation, and multimodality, marking the growth of my leadership as a Lecturer.

Openness and international engagement have been a main theme throughout my career. I release all datasets, models, and tools publicly, and I currently serve as Open Research Lead at the University of Dundee. I have undertaken research stays abroad, built collaborations across Europe and Asia, organised tasks and workshops at A* conferences, and supervised undergraduate students whose projects have received the highest marks and resulted in peer-reviewed publications.

Under the Ramón y Cajal Fellowship, I will focus on real-time identification of LLM-generated misinformation. I aim to integrate argumentative knowledge into LLM inference and reasoning to reduce hallucination-driven misinformation, and to develop an argumentation-powered agent capable of detecting persuasive fallacies and falsehoods in social media posts generated by LLM-driven disinformation bots. This research builds directly on my expertise in argumentation schemes, LLM reasoning, and online harm mitigation.

Resumen del Currículum Vitae:

Ramon Ruiz-Dolz (RRD) has demonstrated his capability to produce impactful research and software widely used by the NLP and AI communities. Evidencing his work efficiency and capability to deliver, RRD obtained his PhD from the Universitat Politècnica de València in June 2023 and secured his lectureship at the University of Dundee in November 2023 with an effective start date in March 2024. In the meantime, he worked as a Postdoc at ARG-tech, from February 2023 until February 2024, effectively managing his work as a Postdoc with the last year of his PhD, which was graded excellent cum laude and awarded with the extraordinary prize.

RRD has published as primary author more than 30 papers accumulating a total of more than 260 citations, including some of the most recent impactful work in the field of computational argumentation. These papers include 6 journal papers indexed in the JCR such as the high-impact IEEE Intelligent Systems, the Autonomous Agents and Multi-Agent Systems journal, or the User Modeling and User-Adapted Interaction journal. Furthermore, RRD has also published more than 20 papers in world-class conferences and workshops such as the Association for Computational Linguistics (ACL). In addition to the scientific publications, RRD has also been internationally leading in the development of open-source tools for the analysis of natural language argumentation. He has released three of the largest publicly available argumentative corpora in Zenodo, totalling more than 10,000 downloads. Furthermore, RRD has also shared with the community more than 40 open-source fine-tuned language models for argumentative tasks having a total of more than 20,000 downloads in Hugging Face.

RRD is a member of the ELLIS Society and has a strong international network. Currently, RRD is working together with Stella Heras (Spain) and Yangqiu Song (Hong Kong) in funded research projects, with Yansong Feng (P.R.China) in developing an international collaboration proposal, with Noriko Kando and Chung-Chi Chen (Japan) to establish a formal connection between the University of Dundee and the National Institute of Informatics, and with Henning Wachsmuth (Germany) in developing another joint grant proposal. Furthermore, RRD is collaborating with teams from Dundee (UoD, UK), Valencia (UPV, Spain), the Basque Country (HiTZ, Spain), Bologna (UoB, Italy), Passau (UPassau, Germany), Taipei (NTU, Taiwan), and Tokyo (NII, Japan).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

in the development of new research papers. RRD has also given invited talks at the Barcelona Supercomputing Centre (2022), Universitat Politècnica de València (2024), Università della Svizzera Italiana (2025), ELLIS Alicante (2025), and Peking University (2025).

RRD has also been actively involved in the natural language argumentation processing communities. He organised DialAM-2024 a research shared task in argument mining co-located with ACL 2024, the world-leading conference on computational linguistics. This shared task attracted teams from DFKI (Germany), HKUST (Hong Kong), UB New York (US), and Cornell (US). RRD also organised the 12th Workshop on Argument Mining, co-located with the ACL 2025. RRD is an Area Chair for the ACL ARR, and part of the Program Committee of world-leading conferences such as IJCAI or AAMAS. He serves as a reviewer for international journals including IP&M, KaIS, or IEEE/ACM TASLP, among others.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: COLOMBANO SOSA, MARTIN FACUNDO
Referencia: RYC2025-056615-I
Correo Electrónico: culiadomartin@gmail.com
Título: Nanophotonic and Optomechanical Control of Mechanical Motion

Resumen de la Memoria:

Nanophotonics is a key enabling technology for next-generation optical communications, microwave photonics, and integrated information systems. Within this framework, optomechanics plays a central role by enabling signal generation, modulation, and transduction for advanced communication and sensing applications. My scientific career has followed a coherent trajectory aimed at addressing these challenges through a multidisciplinary profile combining theoretical nanophotonics, integrated optoelectronics, advanced nanofabrication, and precision experimental techniques. I have played a pivotal role in the simulation, fabrication, and experimental characterization of nanophotonic systems, bridging fundamental physics with device-oriented implementations.

One of my first major contributions was the experimental demonstration of optical chaos in an optomechanical nanobeam (Nature Communications, 2017), showing that light-controlled nanoscale mechanical systems can generate fully controllable chaotic signals. This work opened new avenues for secure optical communications and introduced chaos as a functional resource in nanophotonics. I later achieved the first unambiguous demonstration of purely mechanical synchronization between two optomechanical crystals on the same silicon chip (Physical Review Letters, 2019), the true nanoscale analogue of Huygens' synchronized pendulums and a central achievement of the EU FET-Open project PHENOMEN.

A second major line of my work has focused on hybrid optomechanical sensing. During my PhD, I developed a ferromagnetic-resonance-assisted optomechanical magnetometer (Physical Review Letters, 2020), combining optomechanics and spintronics in a single platform. This device achieved a pico-Tesla sensitivity at room temperature, ranking among the most sensitive magnetometers worldwide. In parallel, I contributed to the development of silicon and Si/AlN optomechanical platforms enabling GHz-frequency microwave-optical transduction at room temperature (ACS Photonics, 2022), directly linking optomechanics with applied communication technologies.

After my PhD, I expanded my research toward hybrid quantum optomechanical systems based on III-V semiconductors. Within the ERC Consolidator Grant NOMLI at CNRS, I played a central role in the first observation of exciton-polaritons and polariton lasing in optomechanical GaAs quantum-well microdisk resonators (Physical Review Letters, 2024), establishing a new class of devices combining photons, phonons, and polaritons on a single chip. My research at ETH Zurich, supported by my SNSF Fellowship as PI, extends these concepts to the quantum regime of levitated nanoparticles. One of my main goals is the experimental demonstration of force detection below the zero-point motion using squeezed states of a levitated nanoparticle (Nature, under review), overcoming the quantum limit. In the future, I aim to develop synchronized networks of mechanical resonators for advanced sensing and information technologies.

Resumen del Currículum Vitae:

I am an SNSF Postdoctoral Fellow at the Swiss Federal Institute of Technology (ETH Zurich), conducting independent research at the Photonics Laboratory and the Quantum Center. I have over ten years of experience in the design, fabrication, and experimental characterization of nanostructured photonic and optomechanical devices for sensing, communications, and emerging quantum technologies. My expertise spans silicon and III-V semiconductor platforms, integrating nanophotonics, optoelectronics, and quantum optomechanics.

I obtained my MSc in Radiation and Nanotechnology at the University of Granada, where I joined the ERC Starting Grant Trapsensor project and contributed to the establishment of the first ion-trap laboratory in Spain. In 2016, I was awarded the highly competitive Severo Ochoa Excellence Fellowship to pursue my PhD at ICN2, which I completed in 2020 with Cum Laude distinction and International PhD mention within the EU FET-Open project PHENOMEN. My doctoral research led to pioneering contributions in nonlinear optomechanics, synchronization, and nano-electro-optomechanical systems, and was recognized with the Best PhD Thesis Award from the Autonomous University of Barcelona. During my PhD, I carried out a research stay at CNR-NANO (Italy) on metasurfaces and surface acoustic waves, resulting in three publications and the establishment of a long-term collaboration.

Following a postdoctoral appointment at the University of Barcelona, I joined CNRS (France) in 2021 within the ERC Consolidator Grant NOMLI, where I established and led a new research line on hybrid GaAs optomechanical cavities integrating exciton-polaritons. In 2024, I joined ETH Zurich within the ERC Synergy Grant Q-Xtreme and was awarded a highly competitive SNSF Postdoctoral Fellowship (€273k), becoming Principal Investigator of my own project on synchronization and quantum control of levitated nanoparticles.

I have authored 22 publications, 18 of them in Q1 journals, with an h-index of 11 and more than 500 citations. I have contributed to five major international projects (ERC, FET-Open, national and Swiss), accounting for over €7M in competitive funding, and have collaborated with more than 15 international partners. I have presented my work at 60 international conferences, and my research has received several press mentions. I have supervised PhD, MSc, and Bachelor students, serve as a reviewer for leading journals, and am actively involved in teaching and outreach in quantum engineering.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: CASTILLO BARNES, DIEGO
Referencia: RYC2025-055738-I
Correo Electrónico: diego.castillo.barnes@gmail.com
Título: Advanced Signal Processing and Predictive Modeling in Neuroscience and Clinical Medicine
Resumen de la Memoria:

Mi trayectoria científica se ha desarrollado en la intersección entre el procesamiento de señales biomédicas y la inteligencia artificial aplicada a problemas clínicos complejos. Desde mi etapa predoctoral en el grupo SiPBA (UGR), me especialicé en técnicas de modelado para neurodegeneración, desarrollando aportaciones metodológicas como un algoritmo EM para mezclas de distribuciones alfa-estables y nuevas metodologías de ensemble learning con pesado no lineal para análisis multimodal. Este periodo culminó con el primer modelo de estratificación a nivel mundial para Alzheimer autosómico dominante dentro de la red internacional DIAN, integrando información genética, neuroimagen y variables cognitivas para caracterizar fenotipos específicos de mutación.

Tras la defensa de mi tesis, amplí mi actividad en neuroimagen por ejemplo mediante la cuantificación del impacto de la normalización espacial en imagen funcional, evaluando su impacto en la inferencia clínica y en la extracción de biomarcadores robustos.

Posteriormente, ya en el grupo BioSiP (UMA) mediante una Juan de la Cierva, he desarrollado modelos para el estudio de la conectividad neuronal usando señales de EEG. En colaboración con el grupo LaSEEB (Universidad de Lisboa), he propuesto modelos probabilísticos para inferir cross-frequency coupling y desarrollé un framework bayesiano para estimar el acoplamiento fase-amplitud con cuantificación de incertidumbre y análisis de patrones de sincronización cortical.

En todo este proceso, también he consolidado una línea independiente en oncología a través de colaboraciones estables con servicios hospitalarios del Hospital Universitario San Cecilio de Granada y del Hospital Universitario Virgen de la Victoria de Málaga, orientada al análisis de respuesta a tratamientos, toxicidades asociadas y alteraciones genómicas, especialmente en cáncer de pulmón y melanoma.

Desde 2024, y ya dentro del ERC Starting Grant ORACLE, he extendido estas competencias al ámbito cardiovascular, liderando el diseño analítico y la integración de machine learning con datos clínicos y series temporales metabólicas. He desarrollado frameworks para la estratificación personalizada del riesgo en síndrome coronario agudo, modelos de identificación de fenotipos cardiometabólicos y sistemas para la estimación de riesgos individuales, en colaboración con equipos internacionales de la Universidad de Florida y la Universidad de Messina.

La línea de investigación que propongo para el programa RyC se apoya en esta trayectoria transversal y consiste en el desarrollo de modelos probabilísticos e interpretables para caracterizar la heterogeneidad del cáncer cerebral. El objetivo es construir un mapeado fenotípico unificado que integre radiómica, genómica y trayectoria clínica para mejorar el diagnóstico, la estratificación molecular y la planificación terapéutica personalizada mediante técnicas de similitud, modelado de supervivencia e interpretabilidad. Esta línea supone una evolución natural de mis competencias metodológicas y, al mismo tiempo, una expansión hacia un dominio no abordado previamente en mis grupos o proyectos anteriores, consolidando una línea propia en IA aplicada a la oncología de precisión.

Resumen del Currículum Vitae:

Mi actividad investigadora se centra en la inteligencia artificial aplicada a datos clínicos, integrando señal biomédica, neuroimagen, EEG y datos cardiometabólicos para resolver problemas de diagnóstico, estratificación y predicción clínica. Mi perfil combina modelado matemático, análisis multimodal y metodologías interpretables con una orientación traslacional consolidada en colaboraciones clínicas internacionales.

He publicado 26 artículos JCR (23 en Q1), con un h-index de 17 (Google Scholar) y más de 1.200 citas. Tres trabajos se sitúan en el top 1% de su categoría y ocho en el top 10%. Soy primer o último autor en el 37% de mis publicaciones, incluyendo contribuciones en Information Fusion, IEEE-JBHI, Expert Systems with Applications o International Journal of Neural Systems. Entre mis aportaciones metodológicas destacan el estudio del manifold en Alzheimer, el algoritmo EM para mezclas alfa-estables y nuevos modelos de ensemble learning con pesado no lineal.

He participado en proyectos financiados con más de 2,16 M€, y he captado individualmente más de 400 k€ mediante contratos y becas competitivas (FPI, Juan de la Cierva, Margarita Salas, Sara Borrell). He ejercido liderazgo científico en varias iniciativas, incluyendo mi rol como responsable analítico del ERC Starting Grant ORACLE y como Co-IP de un proyecto en evaluación sobre exposición ambiental y cardiopatía isquémica.

Mi experiencia internacional incluye 15 meses de estancias en centros de referencia (Universidad de Cambridge, LMU de Múnich, LaSEEB-Lisboa y Universidad de Messina), donde desarrollé trabajos de alto impacto, como el primer modelo mundial de estratificación para Alzheimer autosómico dominante dentro de la red DIAN, métodos avanzados de análisis de EEG y sistemas de estratificación cardiometabólica.

En el ámbito docente he impartido más de 400 horas en grados de ingeniería y másteres, y he dirigido seis TFGs, un TFM y una tesis doctoral en curso sobre sistemas de recomendación personalizados basados en EEG.

Mi actividad de transferencia incluye el acuerdo ALSI con Roche Pharma, el proyecto PASTORA con Endesa y el desarrollo de herramientas abiertas como el framework bayesiano para acoplamiento fase-amplitud o el simulador de niños virtuales para evaluación de intervenciones en dislexia. Soy co-inventor de una patente en evaluación para la visualización tridimensional de actividad cerebral mediante señales de EEG.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025
Turno General

Mantengo un papel activo en la comunidad científica: he revisado 96 artículos para 34 revistas JCR y he ejercido funciones editoriales en Frontiers. Desde 2019 participo en la organización del congreso internacional IWINAC/ICINAC y he presentado 45 comunicaciones en 22 congresos internacionales, incluyendo TCT, ESMO, IWINAC/ICINAC y ASCO.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones

Nombre: PIZZO, ANDREA

Referencia: RYC2025-056387-I

Correo Electrónico: apizzo.tlc@gmail.com

Título: Electromagnetic Information Processing

Resumen de la Memoria:

I conduct fundamental research in multiantenna technology for 6G communications and beyond. My work integrates information-theoretic principles with electromagnetic modeling to an emerging area known as electromagnetic information theory to enable more efficient physical-layer design of wireless communication systems.

Energy Efficient Wireless Networks

I have investigated the energy efficiency of massive MIMO networks under a realistic multi-slope pathloss model. The analysis demonstrates that interference reduction through massive MIMO signal processing can outweigh the energy cost of network densification, providing practical guidelines for energy-aware 5G deployment. I have also contributed to algorithmic routines for the energy efficiency optimization, enabling systematic design of energy-efficient network architectures.

Physical Channel Modeling and Holographic MIMO

I have established the theoretical and technological foundations of holographic MIMO, where densely packed antennas and large apertures allow unprecedented electromagnetic field control. I have developed an asymptotic spatial Karhunen-Loève expansion of the wireless channel, based on a rigorous Fourier spectral representation for electromagnetic random fields. This framework allows efficient (Fourier-like complexity) modeling of wide-aperture, high-frequency MIMO systems. Additionally, I have formulated near-field models for MIMO links assisted by reconfigurable intelligent surfaces, revealing fundamental insights into their performance as engineered reflectors relative to naturally occurring reflections.

Electromagnetic Signal Theory

By linking first-principles electromagnetic modeling with signal-theoretic analysis, I have established the spatial degrees of freedom of MIMO channels, providing an electromagnetic analogue of Shannon's time-bandwidth formula. This analysis shows that electromagnetic propagation inherently imposes a low-pass spatial filtering effect, defining the spatial counterpart of the Nyquist-Shannon sampling theorem. These results set the fundamental limits for holographic MIMO systems and inform energy-efficient implementations of hybrid MIMO architectures.

Reconfigurable Electromagnetic Structures

I introduced the information-theoretic foundations of reconfigurable MIMO, demonstrating that mutual coupling among antennas can be harnessed to counteract fading and dynamically tune radiation patterns across signal-to-noise-ratio regimes. I further identified a new regime of array superdirectivity, in which directivity scales faster than linearly with antenna count due to accrued coupling. These findings establish novel electromagnetic scaling laws with implications for adaptive MIMO design, high-directivity communication, and wireless power transfer.

Resumen del Currículum Vitae:

I hold a PhD degree in Information Engineering from the University of Pisa, supervised by Prof. Luca Sanguinetti. My doctoral research focused on energy-efficient cellular networks based on massive multiple-input-multiple-output (MIMO), at the cornerstone of 5G. During this time, I co-authored a book chapter on this topic with Prof. Sanguinetti and Prof. Emil Bjornson, published by the Institution of Engineering and Technology.

Prior to my PhD, I was a graduate research assistant at the Delft University of Technology (TUDelft) working with Prof. Geert Leus on signal processing algorithms for the underwater localization of autonomous vehicles, in a project funded by NWO and the Dutch Navy.

My trajectory in electromagnetic information theory began during a research visit and subsequent postdoctoral appointment at New York University (NYU) with Prof. Thomas Marzetta, the originator of massive MIMO. At NYU, I contributed to pioneering work on holographic MIMO, a new multiantenna paradigm that envisions spatially continuous antenna arrays. I developed first-principles electromagnetic models and translated them into spectrally-efficient communication architectures. This work was supported by industry funding from FutureWei and donations from Nokia.

I am now a researcher at the Universitat Pompeu Fabra (UPF), collaborating with Prof. Angel Lozano. I first joined UPF as a postdoctoral fellow under the aegis of the EU-funded María Zambrano fellowship. At UPF, I have broadened my research to include information-theoretic limits of reconfigurable electromagnetic systems, where antenna properties adapt dynamically to propagation conditions. These results shed light on the achievable limits by smart radio environments.

My research has been published in high-impact IEEE journals and has received international attention: it has been featured by the IEEE Communications Society on their YouTube channel and have led to invited talks at Princeton University, New York University, the University of Southern California, and TU Berlin. My doctoral work received the 2018 IEEE Young Author Best Paper Award from IEEE ComSoc/VTS (Italy Chapter).



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Turno General

Beyond research, I have contributed actively to the IEEE ComSoc. I served as an Associate Editor for IEEE Wireless Communications Letters, regularly review top-tier IEEE journals, participate on technical program committees for major IEEE conferences, and contribute to the IEEE Communication Theory Technical Committee.

I also bring extensive and diverse teaching experience. I have served as an Adjunct Professor at NYU, and over the past five years at UPF, I have taught core undergraduate courses in signal theory and electromagnetism. I have coordinated and supervised graduate students across institutions, and have served as examiner in a PhD defense.